Hoop Snake Discovery | Million Dollar ET Search | Poe Murder Mystery | Brain Training | The Silent Chamber of Insanity

Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON Vol. 48, No. 1 | January/February 2024

BIGFOOT IS DEAD

$5.99 CAN/US

02

0 09281 02614 3

CSI
Committee for Skeptical Inquiry

Committee for Skeptical Inquiry | www.skepticalinquirer.org

Robyn E. Blumner,* President and CEO
Barry Karr,* Executive Director
Joe Nickell, Senior Research Fellow
Massimo Polidoro, Research Fellow
Benjamin Radford, Research Fellow
Richard Wiseman, Research Fellow

Fellows

James E. Alcock*, psychologist, York Univ., Toronto
Marcia Angell MD, former editor-in-chief, *New England Journal of Medicine*
Kimball Atwood IV MD, physician, author, Newton, MA
Banachek, professional magician/mentalist magic consultant/producer
Stephen Barrett MD, psychiatrist, author, consumer advocate, Pittsboro, NC
Robert Bartholomew, sociologist and investigative journalist, Botany College in Auckland, New Zealand.
Jann Johnson Bellamy, attorney, writer for *Science-Based Medicine* blog, Tallahassee, FL
Kenny Biddle, investigator, writer, podcaster, public speaker
Sandra Blakeslee, science writer; author; *New York Times* science correspondent
Susan Blackmore, visiting lecturer, Univ. of the West of England, Bristol
Alejandro Borgo, journalist and writer, Buenos Aires, Argentina
Mark Boslough, physicist, Sandia National Laboratories (retired), Albuquerque, New Mexico
Glenn Branch, deputy director, National Center for Science Education
Henri Broch, physicist, Univ. of Nice, France
Jan Harold Brunvand, folklorist, professor emeritus of English, Univ. of Utah
Sean B. Carroll, molecular geneticist, vice president for science education, Howard Hughes Medical Institute, Madison, WI
Thomas R. Casten, energy expert; chair, Myno Carbon Corp., Hinsdale, IL
Timothy Caulfield, professor of health law and policy, University of Alberta, Canada
Clark R. Chapman, planetary scientist, Southwest Research Institute (retired), Boulder, CO
K.C. Cole, science writer, author, professor, Univ. of Southern California's Annenberg School of Journalism
John Cook, Center for Climate Change Communication, George Mason University, Virginia
Jerry A. Coyne, professor emeritus, Dept. of Ecology & Evolution, Univ. of Chicago
Frederick Crews, literary and cultural critic, professor emeritus of English, Univ. of CA, Berkeley
Manfred Cuntz, distinguished professor, astrophysicist, Univ. of Texas at Arlington
Richard Dawkins, zoologist, Oxford Univ.
Geoffrey Dean, technical editor, Perth, Australia
Daniel C. Dennett, Austin B. Fletcher Professor of Philosophy, director of Center for Cognitive Studies at Tufts Univ.
Ann Druyan, writer and producer; CEO, Cosmos Studios, Ithaca, NY
Sanal Edamaruku, president, Indian Rationalist Association and Rationalist International
Taner Edis, professor of physics, Truman State University
Mark Edward, mentalist, skeptic, author, Salinas, CA
Edzard Ernst, emeritus professor, Complementary Medicine, Peninsula Medical School, Universities of Exeter and Plymouth, Exeter, UK
Kenneth Feder, professor of anthropology, Central Connecticut State Univ.
Krista Federspiel, medical journalist, author, folklorist
Kevin Folta, molecular biologist. Professor and chairman of the Horticultural Sciences Department at the University of Florida
Barbara Forrest, professor of philosophy, SE Louisiana Univ.
Craig A. Foster, professor of psychology at SUNY Cortland, and writer
Andrew Fraknoi, astronomer, U. of San Francisco
Christopher C. French, professor, department of psychology, and head of the Anomalistic Psychology Research Unit, Goldsmiths College, Univ. of London
Julia Galef, writer, podcaster, public speaker
Luigi Garlaschelli, chemist, Università di Pavia (Italy), research fellow of CICAP, the Italian skeptics group
Maryanne Garry, professor, Dept. of Psychology, University of Waikato, New Zealand
Susan Gerbic, founder and leader of the Guerrilla Skepticism on Wikipedia (GSoW) project
Thomas Gilovich, psychologist, Cornell Univ.
David H. Gorski, cancer surgeon and researcher at Barbara Ann Karmanos Cancer Institute, Wayne State University School of Medicine
Natalie Grams-Nobmann, medical doctor, Heidelberg, Germany
David Robert Grimes, physicist, cancer researcher, author, Dublin, Ireland
Wendy M. Grossman, writer; founder and first editor, *The Skeptic* magazine (UK)
Susan Haack, Cooper Senior Scholar in Arts and Sciences, professor of philosophy and professor of Law, Univ. of Miami
Raymond E. Hall, professor of physics, California State University, Fresno
Alan Harris, Jet Propulsion Laboratory, Caltech (retired)
Michael Heap, clinical and forensic psychologist and lecturer (ret.), Sheffield, U.K.
David J. Helfand, professor of astronomy, Columbia Univ.
Terence M. Hines, prof. of psychology, Pace Univ., Pleasantville, NY
Douglas R. Hofstadter, professor of human understanding and cognitive science, Indiana Univ.
Gerald Holton, Mallinckrodt Professor of Physics and professor of history of science, Harvard Univ.
Stephen Hupp, editor of Skeptical Inquirer; psychology professor, Edwardsville, IL.
Deborah Hyde, folklorist, cultural anthropologist, and former editor in chief of the UK-based magazine *The Skeptic*
Ray Hyman*, psychologist, Univ. of Oregon
Stuart D. Jordan, NASA astrophysicist emeritus, former science advisor to Center for Inquiry Office of Public Policy, Washington, D.C.
Barry Karr, executive director, Committee for Skeptical Inquiry, Amherst, New York
Edwin C. Krupp, astronomer, director, Griffith Observatory, Los Angeles, CA
Lawrence Kusche, science writer
Stephen Law, philosopher and author, Oxford University
Nathan H. Lents, professor of biology, City University of New York
Stephan Lewandowsky, psychologist, researcher, Univ. of Bristol, United Kingdom
Jere Lipps, Museum of Paleontology, Univ. of CA, Berkeley
Elizabeth Loftus, professor of psychology, Univ. of CA, Irvine
William M. London, professor emeritus of public health, California State University, Los Angeles
Leighann Lord, standup comedian, author, host of skeptic events and Skeptical Inquirer Presents
Daniel Loxton, writer, artist, editor, Victoria, BC, Canada
Michael E. Mann, distinguished Professor of Atmospheric Sciences and director of the Earth Systems Sciences Center Penn. State Univ.
David Marks, psychologist, City Univ., London
Michael Marshall, investigator, activist, podcaster, and editor of *The Skeptic* (U.K.)
Lee McIntyre, philosopher, writer, Boston University
Mario Mendez-Acosta, journalist and science writer, Mexico City
Tim Mendham, executive officer and editor of *The Skeptic*, Australian Skeptics, Sydney
Kenneth R. Miller, professor of biology, Brown Univ.
David Morrison, space scientist, NASA Ames Research Center
Nikil Mukerji, philosopher, GWUP, Germany
Richard A. Muller, professor of physics, Univ. of CA, Berkeley
Meera Nanda, writer, retired professor of the history of science, Indian Institute of Science Education and Research
Joe Nickell, senior research fellow, CSI
Jan Willem Nienhuys, mathematician, Waalre, The Netherlands
Lee Nisbet, professor emeritus of philosophy, Medaille College
Matthew C. Nisbet, professor of communication, public policy, and public affairs, Northeastern University, Boston
Steven Novella MD, assistant professor of neurology, Yale Univ. School of Medicine
Bill Nye, science educator and television host, Nye Labs
James E. Oberg, science writer
Paul Offit, physician, author, researcher, professor, Univ. of Pennsylvania
Naomi Oreskes, geologist, science historian, professor, Harvard University
Loren Pankratz, psychologist, Oregon Health Sciences Univ.
Natalia Pasternak, microbiologist, writer, president, *Instituto Questão de Ciência*, São Paulo, Brazil
John Paulos, mathematician, Temple Univ.
Clifford A. Pickover, scientist, author, editor, IBM T.J. Watson Research Center
Massimo Pigliucci, professor of philosophy, City Univ. of New York–Lehman College
Steven Pinker, cognitive scientist, Harvard Univ.
Massimo Polidoro, science writer, author, executive director of CICAP, Italy
Anthony R. Pratkanis, professor of psychology, Univ. of California, Santa Cruz
Donald R. Prothero, paleontologist, geologist, author, National History Museum of Los Angeles County
Benjamin Radford, investigator; research fellow, Committee for Skeptical Inquiry
Amardeo Sarma*, chairman, GWUP, Germany
Richard Saunders, Life Member of Australian Skeptics; educator; investigator; podcaster; Sydney, Australia
Joe Schwarcz, director, McGill Office for Science and Society
Eugenie C. Scott*, physical anthropologist, former executive director (retired), National Center for Science Education
Seth Shostak, senior astronomer, SETI Institute, Mountain View, CA
Gale Sinatra, professor of education and psychology, Univ. of Southern California
Simon Singh, science writer; broadcaster; UK
Dick Smith, film producer, publisher, Terrey Hills, N.S.W., Australia
Keith E. Stanovich, cognitive psychologist; professor of human development and applied psychology, Univ. of Toronto
Karen Stollznow, linguist; skeptical investigator; writer; podcaster
Jill Cornell Tarter, astronomer, SETI Institute, Mountain View, CA
Carol Tavris, psychologist and author, Los Angeles, CA
David E. Thomas, physicist and mathematician, Socorro, NM
Nicholas B. Tiller, exercise scientist, author, and writer
Leonard Tramiel, physicist, science communicator, Palo Alto, California
Melanie Trecek-King, associate professor of biology, Massasoit Community College
Neil deGrasse Tyson, astrophysicist and director, Hayden Planetarium, New York City
James Underdown, writer, investigator, founder of Center for Inquiry Investigations Group (CFIIG), Los Angeles
Joseph Uscinski, political scientist, University of Miami
Bertha Vazquez, science teacher, director of the Teacher Institute for Evolutionary Science (TIES)
Indre Viskontas, cognitive neuroscientist, tv and podcast host, and opera singer, San Francisco, CA
Marilyn vos Savant, *Parade* magazine contributing editor
Stuart Vyse*, psychologist, professor, author
Mick West, writer, podcaster, investigator, debunker, Folsom, CA
Richard Wiseman, psychologist, Univ. of Hertfordshire, England
Benjamin Wolozin, professor, department of pharmacology, Boston Univ. School of Medicine

*Member, CSI Executive Council
(Affiliations given for identification only.)

The Skeptical Inquirer (ISSN 0194-6730) is published bimonthly by the Center for Inquiry in association with the Committee for Skeptical Inquiry, P.O. Box 703, Amherst, NY 14226. Printed in U.S.A. Periodicals postage paid at Buffalo, NY, and at additional mailing offices. Subscription prices: one year (six issues), $35; two years, $60; three years, $84; single issue, $5.99. Canadian and foreign orders: Payment in U.S. funds drawn on a U.S. bank must accompany orders; please add US$10 per year for shipping. Canadian and foreign customers are encouraged to use Visa or Master Card.

Inquiries from the media and the public about the work of the Committee should be made to Barry Karr, Executive Director, CSI, P.O. Box 703, Amherst, NY 14226-0703. Tel.:716-636-1425. Fax: 716-636-1733. Email: bkarr@centerforinquiry.org.

Manuscripts for review and editorial inquiries should be sent to Stephen Hupp, Editor, Skeptical Inquirer, via email at shupp@centerforinquiry.org. Please consult our Guide for Authors for style, reference, and submittal instructions. It is on our website at www.skepticalinquirer.org/article-submission-guidelines/.

Articles, reports, reviews, and letters published in the Skeptical Inquirer represent the views and work of individual authors. Their publication does not necessarily constitute an endorsement by CSI or its members unless so stated.

Copyright ©2023 by the Center for Inquiry and the Committee for Skeptical Inquiry. All rights reserved.

To subscribe or change address go to skepticalinquirer.org. Or write to Skeptical Inquirer, P.O. Box 703, Amherst, NY 14226-0703 or call toll-free 1-800-634-1610 (outside the U.S. call 716-636-1425). Old address as well as new are necessary for change of address, with ten weeks advance notice.

Skeptical Inquirer subscribers may not speak on behalf of CSI or the Skeptical Inquirer.

Postmaster: Send changes of address to Skeptical Inquirer, P.O. Box 703, Amherst, NY 14226-0703

cfi A PROGRAM OF CENTER FOR INQUIRY

Skeptical Inquirer January/February 2024 | Volume 48 No. 1

FEATURE ARTICLES

31
Is Bigfoot Dead?
BENJAMIN RADFORD

39
Brain Training: Is There Evidence to Support the Claims?
M.J. SCHNEIDER AND INDRE V. VISKONTAS

45
A Skeptical Approach to Guilt and Innocence in the Judicial Realm
MATTHEW J. SHARPS, KYLE VILLARAMA, FRANKIE RIOS, AND JANA L. PRICE-SHARPS

49
War on Cancer: An Updated Progress Report for Skeptics
REYNOLD SPECTOR

56
Science Does Not Have All the Answers—and This Is Not a Problem
GUILHERME BRAMBATTI GUZZO AND GABRIEL DALL'ALBA

ANNOUNCEMENT

12
Committee for Skeptical Inquiry Elects Twelve New Fellows for 2023

FORUM

59
The Freedom of Speech Does Not Protect Healthcare Grifters
KATIE SULETA

REVIEWS

The Movie Review THEY Don't Want You to Read
STEVE CUNO **62**
The UFO Movie THEY Don't Want You to See. Written, produced, and directed by Brian Dunning

Grimcutty Reveals Dark Thread Tying Together Cases of Moral Panic
DAVID TOLKACZ **63**
Grimcutty. Written and directed by John Ross

COLUMNS

FROM THE EDITOR
Bigfoot Is Dead! **4**

NEWS AND COMMENT
Best Animal Discovery of 2023: The Hoop Snake / Alleged Extraterrestrial Beings in Mexico / Guidance from a Numerologist: Argentina's National Bank / Child Rescue Group Used Psychic in (Not) Saving Children / *The Skeptic* Gives 2023 Ockham and Rusty Razor Awards / The Million Dollar Extraterrestrial Search / Guidance Offered to Counter Marketing of Unproven Cell and Gene Therapies **5**

INVESTIGATIVE FILES
Whodunit? The 'Murder' of Edgar Allan Poe Solved at Last
JOE NICKELL **14**

THE PHILOSOPHER'S CORNER
Pseudoscience: An Ancient Problem
MASSIMO PIGLIUCCI **18**

BEHAVIOR & BELIEF
The Mozart Effect Lives On
STUART VYSE **20**

THE PRACTICAL SKEPTIC
What Happened to Chemtrails?
MICK WEST **23**

THE TIME WARP: SKEPTICISM REVISITED—FROM THE FUTURE
When Pseudoscience Dies: A Biorhythm Case Study
CRAIG A. FOSTER, MCKENNA DUFF, PAIGE HATFIELD **26**

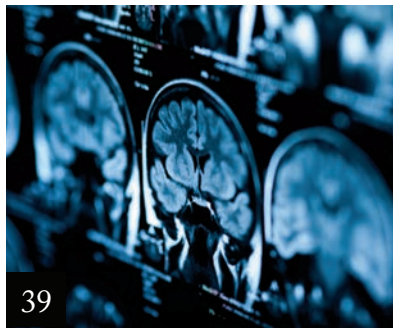
SKEPTICAL INQUIREE
Investigating the Silent Chamber of Insanity
BENJAMIN RADFORD **28**

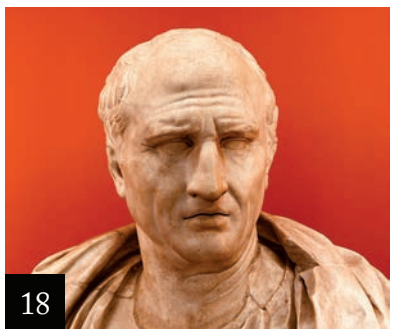
NEW AND NOTABLE **60**

FUN & GAMES **61**

SECRETS REVEALED **64**

LETTERS TO THE EDITOR **65**





Committee for Skeptical Inquiry
"… promotes scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims."

[FROM THE EDITOR

Bigfoot Is Dead!

In our cover story, Ben Radford asks, "Is Bigfoot Dead?" In the article, before considering the evidence, we first encounter a history of key developmental milestones, such as Bigfoot's 1958 birth in the pages of the *Humboldt Times* based on footprints discovered in California. In the years that followed, the idea of Bigfoot continued to develop with evidence such as the 1967 film of the beast's stroll through a forest (fortunately captured on a nearby camera by two men trying to film a Bigfoot). Skeptical Inquirer wasn't yet around to report on Bigfoot's first steps, but reporting was well underway by the time he reached maturity. Type "Bigfoot" into the search tool at skepticalinquirer.org to find over 200 results from noted contributors such as Kenny Biddle, Michael Dennett, Sharon Hill, Eugenie Scott, and Robert Sheaffer. You'll also find that Paul Kurtz wrote the first SI Bigfoot article, titled "Bigfoot on the Loose: Or How to Create a Legend," in the Fall 1980 issue. Check out the heated follow-up two issues later with a cryptozoologist ("Beckjord on Bigfoot") if you'd like to see Kurtz respond to someone who has accused him of making more than twenty-five mistakes. (All SI past issues are available for download with your subscription!) And, more recently, we have monstrous insights from Joe Nickell, such as "Bigfoot Lookalikes: Tracking Hairy Man-Beasts" (September/October 2013).

But here's the thing: I've been subscribing to SI since 2012, and I couldn't remember a cover featuring Bigfoot in all that time. Given that the skeptical community has been criticized for focusing too much on frivolous topics, I decided to search to see when Bigfoot last made a cover appearance (you can search here too: https://skepticalinquirer.org/archive/). Folks, it's been over two decades since Ben's reporting made the cover in 2002. More searching revealed only two other Bigfoot covers across the forty-seven volumes (in 1999 and 1989). By comparison, 2021 was the last time a UFO was on the cover, and at least nine other covers have featured stories on encounters with extraterrestrials.

The U.S. government (previous issue) and the Mexican government (this issue) both appear to be taking claims of encounters with extraterrestrials seriously, but they seem to care less about Bigfoot. Perhaps their apathy is related to absent findings from shows such as *Finding Bigfoot* and the *10 Million Dollar Bigfoot Bounty*. To be fair, Bigfoot recently made news again with a video from Colorado, but this one feels different, doesn't it? Everyone seems to be in on the joke, or at least most people seem to now realize—thanks to decades of skeptical reporting—just how easy it would be for someone to put on a costume and have some fun.

Overall, the thorough reporting in the cover story points to the reality that true belief in Bigfoot is indeed dead, and I thank Ben for the article and Celestia Ward for beautifully depicting the funeral on the cover! Lastly, one of the things I love most about this magazine is its ability to report on fun topics, such as Bigfoot and UFOs, while also covering more important topics, such as some of the other featured articles in this issue on the judicial system (Matthew Sharps and colleagues), brain training (M.J. Schneider and Indre Viskontas), and cancer (Reynold Spector). We hope you enjoy all the discoveries within.

—Stephen Hupp

Skeptical Inquirer™
THE MAGAZINE FOR SCIENCE AND REASON

EDITOR Stephen Hupp
DEPUTY EDITOR Benjamin Radford
MANAGING EDITOR Julia Lavarnway
ASSISTANT EDITOR Nicole Scott
ART DIRECTOR Alexander Nicaise
WEBMASTER Michael Powell
PUBLISHER'S REPRESENTATIVE Barry Karr

EDITORIAL BOARD James E. Alcock, Robyn E. Blumner, Ray Hyman, Barry Karr, Elizabeth Loftus, Joe Nickell, Amardeo Sarma, Eugenie C. Scott, David E. Thomas, Leonard Tramiel, Stuart Vyse

CONTRIBUTING EDITORS David Morrison, Joe Nickell, Matthew C. Nisbet, Massimo Pigliucci, Massimo Polidoro, David E. Thomas, Stuart Vyse, Mick West, Richard Wiseman

Published in association with
CENTER FOR INQUIRY

CHAIR Edward Tabash
PRESIDENT AND CEO Robyn E. Blumner
CHIEF FINANCIAL OFFICER Barry Karr
CORPORATE COUNSEL Ronald A. Lindsay, Brenton Ver Ploeg
SUBSCRIPTION DATA MANAGER Jacalyn Mohr
DIRECTOR OF MARKETING AND COMMUNICATIONS Jeff Dellinger
DIRECTOR OF LIBRARIES Timothy S. Binga
EXECUTIVE DIRECTOR, RICHARD DAWKINS FOUNDATION FOR REASON & SCIENCE Robyn E. Blumner
DIRECTOR OF DEVELOPMENT Debbie Allen
DIRECTOR, DIGITAL PRODUCT AND STRATEGY Michael Powell
DIRECTOR OF GOVERNMENT AFFAIRS Azhar Majeed
DIRECTOR OF EDUCATION; DIRECTOR, TEACHER INSTITUTE FOR EVOLUTIONARY SCIENCE Bertha Vazquez
SYSTEM ADMINISTRATOR Cody Hashman

BOARD OF DIRECTORS Edward Tabash (chair), Reza Abbaszadeh, Vinod Bhardwaj, David Cowan, Richard Dawkins, Brian Engler, Barry A. Kosmin, Bill Maxwell, Julia Sweeney, J. Anderson Thomson Jr., Leonard Tramiel. *Honorary:* Rebecca Newberger Goldstein, Susan Jacoby

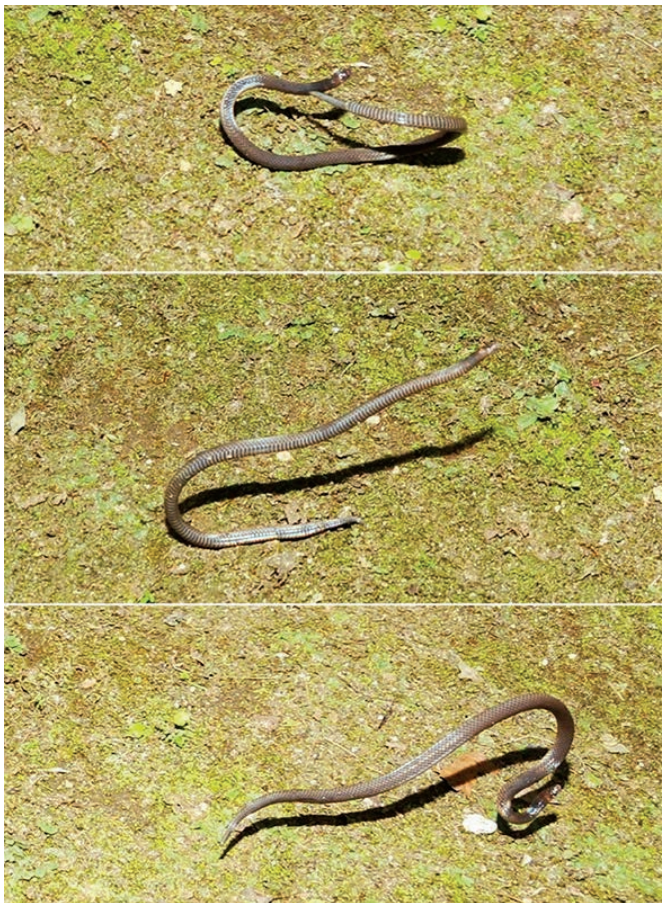
STAFF John Azurin, Kenny Biddle, Melissa Braun, Aubrey Cook, Matthew Cravatta, Jessica Davis, Roe Giambrone, Aaron Green, Julia Hassan, Paul Paulin, Eric Shaver, Melissa Sherrard, Vance Vigrass

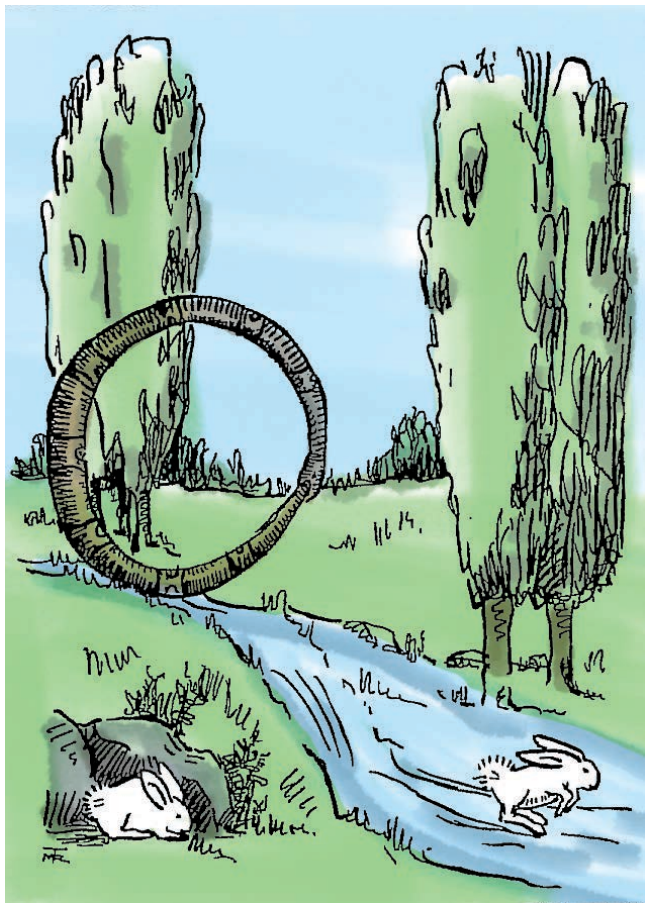
Cover Art by Celestia Ward

CFI Mission: The Center for Inquiry strives to foster a secular society based on reason, science, freedom of inquiry, and humanist values.
Our Vision: A world where people value evidence and critical thinking, where superstition and prejudice subside, and where science and compassion guide public policy.
Our Values: Integrity, Courage, Innovation, Empathy, Learning, and Wonder.

Best Animal Discovery of 2023: The Hoop Snake

Stephen Hupp





Left: Image of Hoop Snake in Action. Photo credit: Evan S.H. Quah. Right: Depiction of Hoop Snake in *Fearsome Critters*. Illustrated by Margaret R. Tryon with color added.

Much like the creature that the new guy is supposed to catch on a "snipe hunt" (wink wink), the hoop snake has long been a fictional creature used to scare young children, new acquaintances, and bunny rabbits. It's been said that the hoop snake bites its own tail and then rolls toward its victim like a stray wheel down a steep hill. Just before attacking, this folkloric reptile straightens and stings the victim with a venomous tail. Dating back to 1784, tall tales about hoop snakes also appear in the Pecos Bill stories.

Perhaps giving cryptozoologists reason for hope, Skeptical Inquirer is naming the hoop snake the Best Animal Discovery of 2023. First published online in *Biotropica* (*The Scientific Journal of the Association for Tropical Biology and Conservation*) and reported later in *Science*, researchers documented an actual snake cartwheeling for the first time (the video was recorded in 2019 but released on April 5, 2023) (Quah et al. 2023). Rather than being a new species, however, this film instead documented a new observed behavior in the dwarf reed snake. Disappointingly, the cartwheeling behavior was used to escape harm (rather than to attack a victim), and the tail contained no venom.

SI reached out to Professor Evan Quah to get his reaction: "My team and I are thrilled that we are the first to formally record and describe this behavior. It greatly expands our knowledge on the kinetic abilities and locomotion in snakes and reptiles as a whole. Time to update the herpetology textbooks! It goes to show how much there is still to learn about the animals around us." ■

Reference

Quah, E.S.H., Larry Lee Grismer, and M.S. Shahrul Anuar. 2023. Observations and description of a rare escape mechanism in a snake: Cartwheeling in Pseudorabdion longiceps (Cantor, 1847)(Squamata, Colubridea). *Biotropica* (April 5). Online at https://doi.org/10.1111/btp.13213.

Stephen Hupp is the editor of Skeptical Inquirer.

Alleged Extraterrestrial Beings in Mexico

Alejandro Borgo

Image credit: Daniel Cardenas / Anadolu Agency via Getty Images

In September 2023, Mexico's Congress was presented with an unusual sight: two small, mummified bodies claimed to be the remains of extraterrestrial beings. They were brought to the storied chambers by a Mexican journalist and UFO researcher named Jaime Maussan. The figures were roughly human in shape, with long thin necks and three fingers on each hand.

As intended, the story was promptly covered in the international press. During his presentation, Maussan explained that the pair, found in Peru six years earlier, are "non-human beings that are not part of our terrestrial evolution." He indicated the specimens were over one thousand years old based on data from the public university National Autonomous University of Mexico (Universidad Nacional Autónoma de México, or UNAM). Maussan emphasized that the extraterrestrial beings were not recovered from crashed UFOs—as is usually the claim regarding nonhuman bodies examined at Area 51, Roswell, and elsewhere—but rather were buried: "These are not mummies; they are bodies that are intact, complete, that have not been manipulated inside and that have a series of elements that make them truly extraordinary."

While tabloids and social media users shared the story widely, scientists were immediately skeptical. The website Proceso titled an article this way: "Scientists Call Jaime Maussan's 'Aliens' a Fraud." The figures had the skeleton of a child, and the discovery was questioned from its place of origin. The alleged bodies were found in the Peruvian coastal desert of Nazca—known for its enigmatic gigantic figures and designs carved into the Earth—but they were never presented in Peru despite Maussan's attempt to disseminate them. UNAM also reacted with skepticism. Julieta Fierro, researcher at the UNAM Institute of Astronomy, said that the matter "makes no sense." The UNAM Institute of Astronomy issued a statement to distance itself from the presentation in San Lázaro. "To date there is no observational or experimental report that offers evidence of life outside Earth or visits from civilizations from other worlds," the academic body said in a statement. If the mummies—parts or all of which seem to be genuinely old and created from animal bones, human bones, and vegetable fibers—are in fact Peruvian, it's not clear how Maussan obtained them or whether he violated any Peruvian antiquities laws.

Maussan presented at the request of a congressman, Sergio Gutiérrez Luna, who did not personally vouch for their authenticity but—in a common gambit among mystery mongers—said he was interested in presenting a wide variety of views and perspectives. Maussan is widely known for promoting outlandish and discredited claims, including the Metepec Creature (which ended up being a monkey), a Demon Fairy (which ended up being a bat), and a child from another planet (which ended up being a mummified child). ■

Alejandro Borgo is the editor of the Spanish-language *Pensar* magazine, published by the Center for Inquiry. He is a CSI fellow.

Guidance from a Numerologist: Argentina's National Bank

Alejandro Borgo

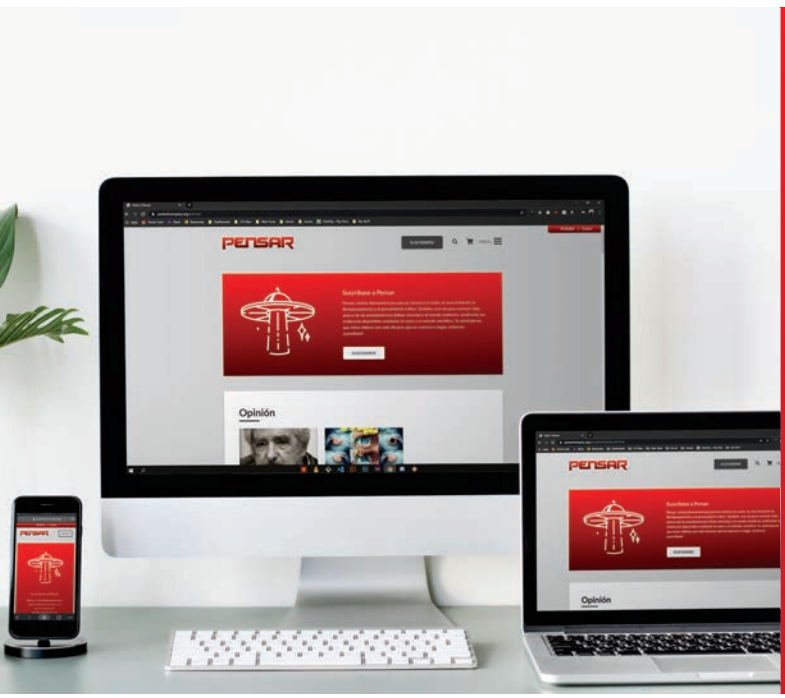
When Argentina's national bank, Banco de la Nación Argentina, hired Verónica Laura Asad (a.k.a. "Pitty") as a consultant, it led to surprise, stupor, and indignation. As *La Voz* newspaper reported on the decision, which appeared to come out of left field, "After it emerged that Pitty, the numerologist, was hired by to conduct coaching sessions with the entity's general manager, María del Carmen Barros, the numbers expert was showered with criticism."

The news shocked many journalists and TV panelists and went viral on social networks. On the radio show *El Observador FM 107.9* in Buenos Aires, one of the panelists said, "We are in a country where you see that your taxes do not return to you, where you see that Pitty, the numerologist, goes and bills Banco Nación to perform numerology on ten economists ….How can a numerologist be in a bank?" Given the negative press of this decision, one can only guess at the thoughts of the manager who made the hiring decision. A quote from Ron Burgundy comes to mind: "I immediately regret this decision." Soon thereafter, the manager was fired.

The event also provoked public outrage, due in part to the fact that public funds were used to pay her fees and the fact that the country has been struggling with spiraling inflation for years. Many felt the decision lacked due diligence. Pitty responded to the criticism, saying, "They hire me and I ask who I have to bill. I had to do a virtual interview and I presented my resume. I did my job for two pesos and fifty [i.e., cheap], for everything I studied. … It's a gift. It's not millions as they say, it's 240 thousand pesos [per month, about US$300, which is significant], and they take the VAT [value added tax] out" of the earnings. She added that her credentials included consulting for many celebrities, politicians, and judges and having books published in several languages.

It's not clear what, exactly, Pitty was hired to do for the bank, though some reports suggested it involved personnel matters and guidance on how best to handle situations based on the birthdates of those involved—for example, treating people differently if their zodiac sign is Libra. As an example of the type of information she might provide the bank, in December 2022 she predicted that 2023 would be marked by an energy of transformation, represented by the number seven. ■

Image credit: April Killingsworth- Wikipedia



PENSAR

The Ibero-American magazine for
Spanish-speaking Skeptics
Published by the Center for Inquiry

Subscribe Now!
Visit pensar.org/product/suscribirse

Child Rescue Group Used Psychic in (Not) Saving Children

Benjamin Radford

The film *The Sound of Freedom*, released on the most patriotic of holidays in 2023, is a fictional account allegedly based on the derring-do of Utahn Tim Ballard (played by Jim Caviezel), a former Department of Homeland Security agent and founder of a group called Operation Underground Railroad (OUR), which is dedicated to fighting child trafficking. The film's trailer ends with Caviezel addressing audiences and asking them to pre-order tickets to "send the message that God's children are no longer for sale" and buy extra tickets for others to see the film (regardless of whether they do or not). This strategy helped make an otherwise obscure faith-based film outperform (at least briefly) the latest installments of the Indiana Jones and *Mission: Impossible* franchises—and raised accusations that the film's box office success had been artificially inflated.

The real-life Ballard and Caviezel are both prominent longtime supporters of QAnon, the political conspiracy that traffics in exaggerated (and at times outright fabricated) claims about child abductions. While *Sound of Freedom* doesn't explicitly identify the evildoers, QAnon adherents believe they know exactly who's behind the shadowy empire of child trafficking: Liberals and Democrats such as Hillary Clinton and George Soros.

Promoted by a parade of conservative celebrities, including Tony Robbins, Mel Gibson, and former president Donald Trump—himself central to QAnon beliefs—the film was celebrated as a triumph of faith-based independent filmmaking. But when success spawned scrutiny, the film's façade began to crumble.

Ballard was accused of sexual misconduct by several women, a claim substantiated by an internal OUR investigation. As Anna Merlan and Tim

Marchman (2023) from *Vice* reported,

> Tim Ballard's exit from Operation Underground Railroad earlier this year followed an investigation into claims of sexual misconduct involving seven women. … Sources familiar with the situation said that the self-styled anti-slavery activist, who appears to be preparing for a Senate run, invited women to act as his "wife" on undercover overseas missions ostensibly aimed at rescuing victims of sex trafficking. He would then allegedly coerce those women into sharing a bed or showering together, claiming that it was necessary to fool traffickers. Ballard … is said to have sent at least one woman a photo of himself in his underwear, festooned with fake tattoos, and to have asked another "how far she was willing to go," in the words of a source, to save children. The total number of women involved is believed to be higher than seven, as that would only account for employees, not contractors or volunteers.

Vice also reported on an anonymous letter—whose accuracy OUR did not dispute—circulating among the Utah philanthropic community warning that

> It was ultimately revealed through disturbingly specific and parallel accounts, that Tim has been deceitfully and extensively grooming and manipulating multiple women for the past few years with the ultimate intent of coercing them to participate in sexual acts with him, under the premise of going where it takes and doing "whatever it takes" to save a child.

Adding to the film's PR nightmare, one of the film's crowdfunding supporters, Fabian Marta, was charged with accessory to child kidnapping; a grand jury later determined there was insufficient evidence to obtain a conviction, and the charges were dropped.

But the problems extended far beyond Ballard's cult of personality and into his organization. *Vice* noted:

> Many of the writeups about the film gloss over OUR's long history of exaggeration and misrepresentation, helpfully bolstering the organization's tallest tales about itself. A number of OUR's claims about its work are dramatically overstated or without clear documentary evidence. People who have volunteered for OUR have raised concerns that it could actually have been creating demand for trafficking victims, by going to foreign countries on undercover "missions" that, at times, have seemed to consist of walking around bars and sex clubs asking for underage girls. The organi-

zation's support for law enforcement has at times been wildly exaggerated and involved OUR taking credit for agencies' operations after making relatively trivial donations, and its much-touted aftercare program for survivors has at times involved things like placing women with unqualified providers and even fabricating a college graduation ceremony.

One heavily promoted OUR success story was that of a young woman, "Liliana," whom Ballard claimed to have rescued from sex traffickers. In fact, she had escaped on her own and had nothing to do with OUR until years later when the organization became aware of her case and contacted her in a transparent attempt to co-opt her story for their promotional videos and literature.

It gets worse: several of those "rescue missions" were led by an alleged psychic. In what was described as a "bizarre, blundering attempted rescue on the Haiti-Dominican Republic border," Ballard and his OUR team relied on information from a Utah-based psychic named Janet Russon. The mission was to rescue a young Haitian boy named Gardy Mardy, whom Russon insisted was nearby—according to her psychic visions mediated by her spirit guide Nephi, a prophet prominent in the Book of Mormon.

While some psychic detectives offer their "services" to grieving families and police for free (usually benefitting from the resulting publicity), documents obtained by *Vice* revealed that OUR was paying Russon "a monthly consultant fee of approximately $5,000 with an hourly/operational readings contract of approximately $1,560." Such hefty fees, presumably, would be worth every donated cent if Russon's psychic services led to exploited children being rescued from dire circumstances. Unfortunately, despite glowing claims and testimonials to the contrary about it being a success story, there seems to be no evidence that Russon's abilities led to Mardy—or anyone else—being rescued. "In fact, Gardy was not found that day, or any day since. There is no evidence to suggest that he was ever in the village where Russon's visions led OUR and his hopeful father." (For more details, see Merlan's excellent *Vice* series.)

Potential donors who visit the OUR website will find plenty of branded products to buy—from jewelry and camouflage-patterned hoodies to gourmet soy candles and beard salves—but no mention that donations to the nonprofit organization are paying psychics to perform pretend child rescues for the glory of Tim Ballard and his organization.

The revelations about the rampant exploitation, fraud, and deception are particularly unseemly and ironic given the conservative context. Because the subject is framed as not only an urgent and overlooked social threat—who could be against rescuing kids from such terrible circumstances?—but also as fueled by Christian righteousness, it has up until recently been insulated from scrutiny and criticism. Operation Underground Railroad and Ballard are in a way manufacturing a problem and then exploiting the sincere concern and goodwill of donors while promoting themselves and failing to do much good.

Abductions of children (and adults) for trafficking is real, of course, but stranger abductions are very rare (most children are abused and abducted by noncustodial parents or caregivers), and outright abductions for trafficking is even rarer. Far more often, the victims go willingly—lured by "friends," family, and trusted peers—by promises of wealth and easier jobs and then forced into domestic or sexual servitude. The performative and staged rescue operations conducted by Tim Ballard and Operation Underground Railroad divert attention and resources from legitimate organizations doing demonstrable good by focusing on mundane realities instead of the sensational rescues depicted in *The Sound of Freedom*.

This is of course just the latest incarnation of the decades-old moral panic about child abductions and trafficking. Conspiracies such as QAnon fuel unfounded fears and rumors, often incorporating lurid vampiric elements such as draining bodily fluids from hostage children. Last year in these pages (September/October 2022), I reported on Daniel Picazo, an innocent man burned to death by a mob responding to rumors of child abductions in Mexico. Other rumors circulating on social media include warnings about abduction rings using zip ties (see "Zip Tie Abduction Rumors Spread, Lead to Panic and Arrests," November/December 2020) and connected to retailers such as Target and Wayfair. ■

Reference

Merlan, Anna, and Tim Marchman. 2023. Tim Ballard's departure from Operation Underground Railroad followed sexual misconduct investigation. *Vice* (September 18). Online at https://www.vice.com/en/article/pkaqvn/tim-ballards-departure-from-operation-underground-railroad-followed-sexual-misconduct-investigation.

Benjamin Radford is deputy editor of Skeptical Inquirer.

The Skeptic Gives 2023 Ockham and Rusty Razor Awards

Julia Lavarnway

On September 23, 2023, the U.K. magazine *The Skeptic* gave out awards for the best of the best in skepticism and the worst of the worst in pseudoscience in the United Kingdom. The awards were given at the magazine's annual QED conference on science and skepticism in Manchester, United Kingdom, as part of its Ockham Awards ceremony.

Knowledge Fight, a podcast created in 2017 by Dan Friesen and Jordan Holmes, takes a penetrating look into the world of political extremism by dissecting the work of propagandist Alex Jones and his Infowars network. Friesen was even invited in 2018 to give expert testimony in the case brought against Jones by Sandy Hook families. Jones had claimed on his Infowars network that the school shooting had been staged; the families successfully sued Jones for defamation. The podcast won the 2023 Ockham Award for Skeptical Activism.

About the award going to *Knowledge Fight*, Michael Marshall, editor of *The Skeptic*, said: "For putting together so comprehensive a picture of Alex Jones's world, and for delivering that deep insight in a format that keeps the audience entertained as well as informed, we're delighted to award the 2023 Ockham Award for skeptical activism to the *Knowledge Fight* podcast."

Not all the awards given that night were positive; the magazine awarded Dr. Aseem Malhotra its 2023 Rusty Razor Award, given to the year's worst promoter of pseudoscience. Malhotra is a celebrity cardiologist in Britain. He is most widely known as a critic of statins, which he has described as a con of the pharmaceutical industry (Malhotra 2016). He also has described the link between heart disease and saturated fat as a "myth" (Boseley 2013). During the COVID-19 pandemic, he became a vocal critic of COVID-19 vaccines. In a 2022 paper, Malhotra described the vaccines as "at best a reckless gamble," because he claims they pose a risk to cardiovascular health (Malhotra 2022). The paper was published in the *Journal of Insulin Resistance*, whose board includes Malhotra.

According to Marshall:

> In our opinion, Dr. Malhotra has been an incredibly prolific promoter of pseudoscience throughout the pandemic, including spreading the false notion that vaccines are responsible for thousands of excess deaths. Dr. Malhotra's media career has given him a very large platform, from which he spreads misinformation that undermines confidence in a health intervention that has saved the lives of countless people across the world. In doing so, he stokes the flames of conspiracy, paranoia and mistrust of medical consensus. ■

References

Boseley, Sarah. 2013. Butter and cheese better than trans-fat margarines, says heart specialist. *The Guardian* (October 23). Online at https://www.theguardian.com/lifeandstyle/2013/oct/22/butter-cheese-saturated-fat-heart-specialist.

Malhotra, Aseem. 2016. The great statin con? *HuffPost* (April 4.) Online at https://www.huffingtonpost.co.uk/dr-aseem-malhotra/great-statin-con_b_9607316.html.

———. 2022. Curing the pandemic of misinformation on COVID-19 mRNA vaccines through real evidence-based medicine—part 1. *Journal of Insulin Resistance* 5(1): a71. Online at https://doi.org/10.4102/jir.v5i1.71.

Julia Lavarnway is managing editor of Skeptical Inquirer.

The Million Dollar Extraterrestrial Search

Farrah Hupp

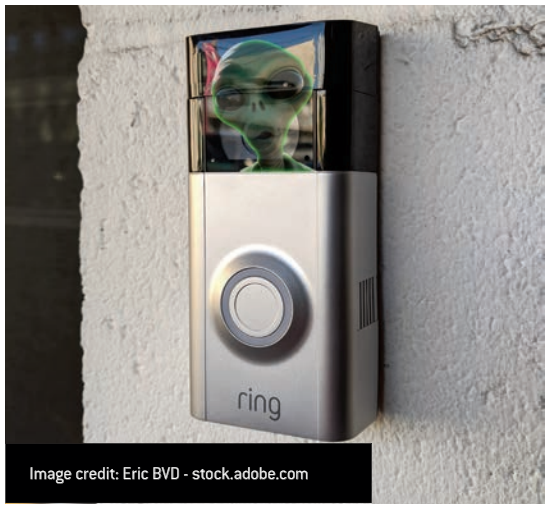


Image credit: Eric BVD - stock.adobe.com

Ring, the video doorbell company, offered customers a Grand Prize of one million dollars if they could capture scientific evidence of an extraterrestrial on their device by November 3, 2023. According to the official rules, the submissions were required to be reviewed by a space and extraterrestrial expert (with a PhD in meteorology and astrobiology) to make sure the video met specific criteria and was not altered. As of late November (when this issue went to press), nobody claimed the million-dollar prize.

Ring also offered a second, considerably smaller, "Out of this World Prize" for an alternate category—the best five videos "recorded with a Ring device documenting someone or something related to extraterrestrials." To win one of the $500 gift cards, these submissions were required to score the highest based on how humorous, creative, and engaging the videos were. For this video submission category, the company encouraged "extraterrestrial communication" through the voice function of the doorbell, as well as costumes, accessories, and homemade spacecrafts. ■

Farrah Hupp is an assistant administrator at Washinton University Medical Center.

Guidance Offered to Counter Marketing of Unproven Cell and Gene Therapies

William M. London

The Committee on the Ethics of Cell & Gene Therapy (ECGT) of the International Society for Cell & Gene Therapy (ISCT) has issued a position paper on direct-to-consumer marketing of unproven and unapproved cell-based, cell-derived, and gene-based therapies/interventions (collectively known as carrier genetic tests, or CGTs) (Ikonomou et al. 2023). The paper includes information on multi-national consumer protection resources related to both proven and unproven CGTs. It states:

> The sheer volume of direct-to-consumer businesses offering unproven CGTs and the exploitation of regulatory ambiguity and/or loopholes have resulted in a global marketplace with widespread patient exploitation. Further reasons exacerbating this problem are the inability of understaffed regulatory agencies to perform rigorous and extensive inspections of such businesses and take enforcement actions, the absence of global regulatory convergence, and transnational travel (also known as medical tourism) of patients seeking unproven CGTs.

The paper identifies frequent features of unproven CGTs, many of which are common in the marketing of other dubious therapies. Among them are unclear scientific rationales, lack of appropriate evidence, inadequate disclosures to patients to enable proper informed consent, use of patient testimonials and celebrity endorsements, and claims that a single treatment approach can help patients with many different and unrelated conditions.

The marketing of unproven CGTs can seduce many consumers to pay exorbitant fees for experimental treatments or for participation in so-called clinical studies. The paper highlights the use of "tokens of legitimacy" that can impress unwary consumers. They include reference to the websites of researchers at reputable research institutions, reference to studies that only appear relevant to the therapies offered, claims of institutional ethics committee review, approval for so-called experimental "studies," registering research on the U.S. federal database clinicaltrials.gov, applying for patent protection, and the use of scientific advisory boards.

When the pitch for therapies is high-tech, it's especially difficult for nonexperts to distinguish fact from fiction. The key is to find trustworthy sources of information. I have relied on the website *The Niche* (https://ipscell.com/) regarding stem cells, regenerative medicine, and innovative biomedical science. It does an excellent job of fact-checking various medical claims and battling hype. I learned about the ICST position paper from its informative blog, which is written mostly by Paul Knoepfler, PhD, a professor in the Department of Cell Biology and Human Anatomy at the University of California, Davis School of Medicine. ■

A version of this news brief previously appeared in Quackwatch's Consumer Health Digest *newsletter.*

Reference

Ikonomou, L., et al. 2023. International Society for Cell & Gene Therapy position paper: Key considerations to support evidence-based cell and gene therapies and oppose marketing of unproven products. *Cytotherapy* 25: 920–929. Online at https://www.isct-cytotherapy.org/article/S1465-3249(23)00064-6/fulltext#%20.

William M. London is an emeritus professor in the Department of Public Health at California State University, Los Angeles, and editor of Quackwatch's *Consumer Health Digest*.

Committee for Skeptical Inquiry Elects Twelve New Fellows for 2023

Clark R. Chapman

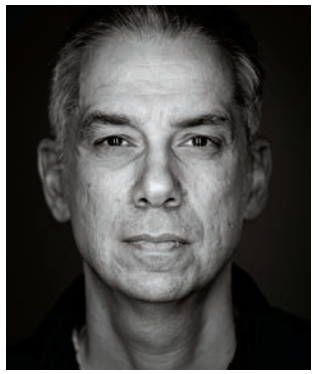
Jerry A. Coyne

Manfred Cuntz

Alan Harris

Stephen Hupp

Stephen Law

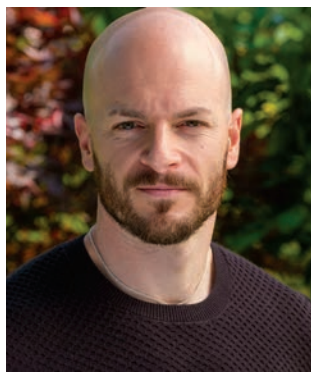


Lee McIntyre

Nikil Mukerji

Meera Nanda

Gale M. Sinatra



Nicholas B. Tiller

Melanie Trecek-King

The Committee for Skeptical Inquiry (CSI) is pleased to announce the election of twelve new fellows based on their distinguished contributions to science and skepticism. Fellows serve as consultants and ambassadors, helping accomplish the mission of CSI. Election is based upon the following criteria:

1. Outstanding contribution to a scientific discipline, preferably, though not restricted to, in a field related to the skeptical movement;
2. Outstanding contribution to the communication of science and/or critical thinking; or
3. Outstanding contribution to the skeptical movement.

Clark R. Chapman, planetary scientist, Southwest Research Institute (retired), Boulder, Colorado. Chapman is an astronomer known for his work on potentially hazardous asteroids. He is the cofounder of the B612 Foundation and a fellow of the American Association for the Advancement of Science. His books include *The Inner Planets* (1977), *Planets of Rock and Ice* (1982), and *Cosmic Catastrophes* (1989). In 1999, he was awarded the Carl Sagan Medal for Excellence in Public Communication in Planetary Science.

Jerry A. Coyne, professor emeritus, Department of Ecology and Evolution, University of Chicago. Coyne is a biologist known for his work on evolutionary genetics. He served as president of the Society for the Study of Evolution and was elected to the American Academy of Arts and Sciences. His books include *Speciation* (2004) and *Faith vs. Fact* (2015). His book *Why Evolution Is True* (2010) was a *New York Times* bestseller, and, in 2015, he won the Richard Dawkins Award from the Center for Inquiry.

Manfred Cuntz, distinguished professor, astrophysicist, University of Texas at Arlington. Cuntz is known for his work on astrophysics, astrobiology, and planetary habitability. He is coauthor of the book *Practical Universe* (2016). In 2020, he was selected as a member of the Academy of Distinguished Teachers at the University of Texas at Arlington for "outstanding teaching, personal commitment to students and the learning process, and the ability to inspire and motivate students."

Alan Harris, Jet Propulsion Laboratory, Caltech (retired). Harris served as a senior research scientist at the Space Science Institute and is a fellow of the American Association for the Advancement of Science. He is coauthor of the children's book *The Great Voyager Adventure* (1990). In 1990, his team won the NASA Group Achievement Award for their work on planning the *Voyager* mission. His contributions to planetary research have also been recognized with the naming of "asteroid 2929 Harris."

Stephen Hupp, editor of Skeptical Inquirer and psychology professor at Southern Illinois University Edwardsville (SIUE). His books include *Pseudoscience in Therapy* (2023), *Investigating Pop Psychology* (2023), and *Investigating Clinical Psychology* (2024). From 2017–2019, he held the Guinness World Record for "longest line of books" thanks to considerable help from the SIUE community.

Stephen Law, philosopher and author, Oxford University, United Kingdom. He is the director of philosophy at the Department of Continuing Education, University of Oxford. His research interests include the mind, language, metaphysics, and religion. His books include *The Great Philosophers* (2008), *Really, Really Big Questions* (2009), and *Believing Bullshit* (2011). Law is the editor of *Think: Philosophy for Everyone*, a journal of the Royal Institute of Philosophy.

Lee McIntyre, philosopher, writer, Boston University. He is a research fellow at the Center for Philosophy and History of Science at Boston University. His books include *How to Talk to a Science Denier* (2021) and *On Disinformation* (2023; see also the New and Notable section in this issue). His book *Post-Truth* (2018) was named the best book of the year by the *PBS NewsHour*.

Nikil Mukerji, philosopher, GWUP, Germany. He is a private lecturer at the Ludwig Maximilian University of Munich and is active in the German skeptics group, the Society for the Scientific Investigation of Parasciences (the initialism for this society is GWUP in German). His books include *Experimental Philosophy* (2019) and *The Case against Consequentialism Reconsidered* (2016).

Meera Nanda, writer, retired professor of the history of science, Indian Institute of Science Education and Research. Nanda writes about science topics related to postcolonialism, postmodernism, and pseudoscience. Her books include *The God Market* (2010), *Prophets Facing Backward* (2004), and *Science in Saffron* (2016). From 2005–2007, she was a fellow in religion and science at the John Templeton Foundation.

Gale M. Sinatra, professor of psychology, Rossier School of Education, University of Southern California. Sinatra is past president of Division 15 (Educational Psychology) of the American Psychological Association (APA) and is also an APA fellow. She studies attitudinal changes and is chair of the APA Climate Change Task Force. Her books include *Evolution Challenges* (2012), *Intentional Conceptual Change* (2016), and *Science Denial* (2021).

Nicholas B. Tiller, exercise scientist, author, and writer, Canada. Tiller is a senior researcher in exercise physiology/respiratory medicine at Harbor-UCLA (University of California, Los Angeles). He is author of the book *The Skeptic's Guide to Sports Science* (2020), and he has an online column for Skeptical Inquirer with the same title. During Tiller's recent appearance on *StarTalk*, Neil deGrasse Tyson revealed SI to be his favorite magazine.

Melanie Trecek-King, associate professor of biology, Massasoit Community College. Trecek-King is a science communicator who teaches science literacy through the website Thinking is Power (thinkingispower.com). She is also the education director for the Mental Immunity Project. In 2022, she gave a *Skeptical Inquirer Presents* talk titled "A Life Preserver for Staying Afloat in a Sea of Misinformation." She was also a featured speaker for CSICon in 2023.

Congratulations! ■

[INVESTIGATIVE FILES JOE NICKELL

Joe Nickell, PhD, was a Pinkerton operative and homicide consultant. He is a literary investigator and has been dubbed "The Detective of the Impossible" by Italian skeptic Massimo Polidoro.

Whodunit? The 'Murder' of Edgar Allan Poe Solved at Last

Whodunit, indeed! The creator of the detective story—America's strange genius, Edgar Allan Poe—was supposedly himself murdered! If not, then what mysterious fate actually befell him?

Genius Afoot

Edgar Allan Poe, the American writer best known for his macabre poems and stories, was born January 19, 1809, in Boston. His parents were young actors—David Poe, who soon disappeared, and Elizabeth, who died of consumption when her son was only two (Edwards 2022, 22). Poe was raised by his godfather, a wealthy Richmond, Virginia, merchant named John Allan. Allan (or at least his wife) had been childless (Shanks 1937, 22).

Allan opened a branch of his firm in Great Britain, and young Poe was taken to England and Scotland for a classical education from age six to eleven (1815–1820). That continued back in Richmond. In 1826, he spent a few months at the University of Virginia studying the classical languages Latin and Greek, as well as such Romance languages as French, Italian, and Spanish.

However, at about seventeen, Poe, always headstrong, had accrued gambling losses that his guardian punished by pulling him from school. Then, returning to Richmond, Poe discovered his supposed sweetheart, Elmira Royster, had married. He went off to Boston where he had his first serious involvement with literature, sensing his destiny by publishing a pamphlet of verse titled *Tamerlane* (1827). Many of the poems, imitative of Lord Byron, concerned Poe's lost love.

Impoverished, Poe joined the army, using the name Edgar A. Perry. However, the death of his foster mother intervened, causing him to buy his way out of his commitment, then seek an appointment to West Point. Before leaving, he published a new volume of poems—leaning toward John Milton and Thomas Moore (the Irish romantic)—titled *Al Aaraaf* (1829). At the academy, he flaunted attendance to seek expulsion, and yet again, with his familiar admixture of genius and poverty, this time he found himself in New York with another volume of verse. Titled simply *Poems* (1831), it nevertheless contained what critics have not hesitated to call "several masterpieces" (Cestre and Mabbott 1960, 103).

Returning to Baltimore, Poe now began to write short stories. In 1833, he won $50 from a city weekly with his celebrated "A MS Found in a Bottle." In two more years, he had returned to Richmond, this time with the editorship of the *Southern Literary Messenger*. He made his name there as a critical reviewer—his first of several such positions. Poe finally wed but even then did so raising eyebrows: He married his cousin Virginia Clemm, not yet fourteen. He seems to have proved a devoted husband (Dawidziak 2023, 20).

Poe was dismissed from his Richmond job, apparently due to drink: "His drinking was the bane of his life. To talk well in a large company he needed a slight stimulant, but a glass of sherry might start him on a spree; and although he rarely succumbed, he was often seen in public when he did. Poe probably did not use drugs but did experience occasional psychotic episodes" (Cestre and Mabbott 1960, 103).

Back again in New York, Poe published a lengthy prose work, *The Narrative of Arthur Gordon Pym* (1838), that combined fact with wild fancy. The following year he became editor of Philadelphia's *Burton's Magazine*, where, inspired by a contract for a monthly feature, he penned "William Wilson" and "The Fall of the House of Usher"—classic Poe tales of supernatural horror. Later in 1839 (but dated 1840), his *Tales of the Grotesque and Arabesque* appeared.

Netflix's adaptation of Poe's stories, *The Fall of the House of Usher* (image credit: Netflix)

Poe's Invention of the Detective Story

Poe resigned from *Burton's Magazine* about June 1840, but then he returned the following year to become editor of its successor, *Graham's Magazine*. The significance of what Poe did next can hardly be overstated.

It was in *Graham's Magazine* that Poe printed the first detective story—not the first *mystery*, nor even the first "locked-room mystery," but the first one to present a detective *per se* in the solving role. Poe created three such stories, each starring his amateur detective, Monsieur C. Auguste Dupin, as the coldly logical hero of what Poe called his "ratiocinative tales" (*Benet's Reader's Encyclopedia* 1987, 283). He did not call them "detective" stories (the word *detective* not yet being fully in use); neither did he apply the word to Dupin or use it in any of his stories.

This first Poe story, "The Murders in the Rue Morgue" (1841) relates the horrific murders of a reputed fortune-teller and her daughter in a locked-room mystery that baffles the Parisian police. (In the tale, Poe specifically acknowledges his debt to Eugène François Vidocq [1775–1857] the real-life "first detective" of history.[1])

Poe reprised Dupin for his next detective story, "The Mystery of Marie Rogêt" (1842–1843) described by Charles Baudelaire, an early translator of Poe, as a "masterpiece." The story was based on a real-life case, the death of "the beautiful cigar girl," Mary Rogers, which Poe transposed from New York City to France. By carefully studying newspaper accounts, Dupin is able to deduce what actually happened to Marie Rogêt, whose body was discovered in the River Seine (Nickell 2010).

This second Poe story thus introduced what would become the proverbial "armchair detective." And it featured a crime writer determining to actually solve a real crime—as later prominent crime writers such as Arthur Conan Doyle and Erle Stanley Gardner would likewise attempt (Edwards 2022, 25). (The practice otherwise generally teaches how different the processes and skills of *creating* a mystery with those of actually *solving* a real one are; Nickell 2010.)

For Dupin's third and final case, "The Purloined Letter" (1842–1843), Poe cleverly made the tale of the crucial missive one of hiding in plain sight. Although this ended his trio of detective stories, Poe did pen two additional stories of the mystery genre: His "The Gold-Bug" (1843) won a $100 prize from the *Philadelphia Dollar Newspaper* and, featuring buried treasure with a secret cipher, indulged Poe's fascination with cryptography. His fifth and final mystery, "Thou Art the Man" (1844), is at once light-hearted and heavy-handed, but its use of unlikely suspects and a villain's deceiving clues became mainstays of later whodunits (Edwards 2022, 25–26).

Celebrity

With his work as a significant editor and his increasingly popular stories, Edgar Allan Poe had arrived. Handsome, if somewhat idiosyncratic, he was appreciated for his sound judgement—he admired both Alexander Pope and Shakespeare—as well as for his own dramatic power as a storyteller. He read aloud poetry, his own and others, it is said, "in a voice of surpassing beauty." And he had a definite sense of humor as evidenced by a gag he tried out alluding to his immediately famous poem, "The Raven" (1845): He quipped a mock apology to a visitor for not keeping a pet raven (Cestre and Mabbott 1960, 103–104).

In 1844, he was again in New York and in 1845 became editor of the short-lived *Broadway Journal*. It was during this year that poet Frances Sargent Osgood became attracted to Poe. His ill wife did not object, although Osgood's indiscretions and open writings caused scandal.

Virginia died in January 1847. The following year, Poe traveled to Rhode Island where he became briefly engaged to poet Helen Whitman. He subsequently also had "platonic entanglements" with other women who assisted him financially and were rewarded with verse tributes (Cestre and Mabbott 1960, 103; Shanks 1937, 74–78).

The genius of Poe became recognized abroad as, belatedly, it did in America—the credit in both instances largely going to his French admirers, Charles Baudelaire and Stéphane Mallarmé. The year 1849 would be his last. He published his lecture *Eureka*, a supposed transcendental "explanation" of the universe—hailed alternately by critics as a masterpiece or nonsense.

Poe expressed some forebodings about death in late September when he left Richmond for Baltimore, just weeks into the second half of his fortieth year. He was on a celebratory spree. Toasting a lady at her birthday party, he reportedly began drinking heavily, and, well, that is the question: What really happened to Edgar Allan Poe?

A Mysterious End

The death of the creator of detective stories is ironically mysterious in its own right. On his final sojourn, Poe said goodbye to an old flame he had reunited with and planned to marry, Elmira Royster. He intended to travel via Richmond to Baltimore by steamer, then take a train to his home in New York, and on the way stop off in Philadelphia. However, after an illness of some five days, there came a tragic press report that Poe had died and was soon buried in Baltimore! The date was October 7, 1849 (Edwards 2022, 20–21; Walsh 2000, 32–35).

Just what might really have happened has become the subject of many theories—if some can even be called that. Poe biographers playing sleuths themselves have suggested for the cause of Poe's death everything from a long-standing heart condition, epilepsy, diabetic coma with liver damage, cerebral meningitis, *delirium tremens* (induced by alcohol or another toxic disorder), hypoglycemia, and even a case of rabies. One long-claimed "explanation" for what happened to Poe was something called "cooping"—an unbelievably crude form of electoral fraud in which some ill or intoxicated victim would be kidnapped then forced to vote repeatedly for some candidate. This idea was spread by anti-Poe gossips for many years, including a jealous enemy of Poe, the Rev. Rufus Griswold (Shanks 1937, 78–80; Symons 1978, 155–170; Geiling 2014).

John Evangelist Walsh, in his *Midnight Dreary: The Mysterious Death of Edgar Allan Poe*, cataloged these ideas and more (2000, viii–xii, 54–60). But Walsh set his own sights on an even more sinister possibility.

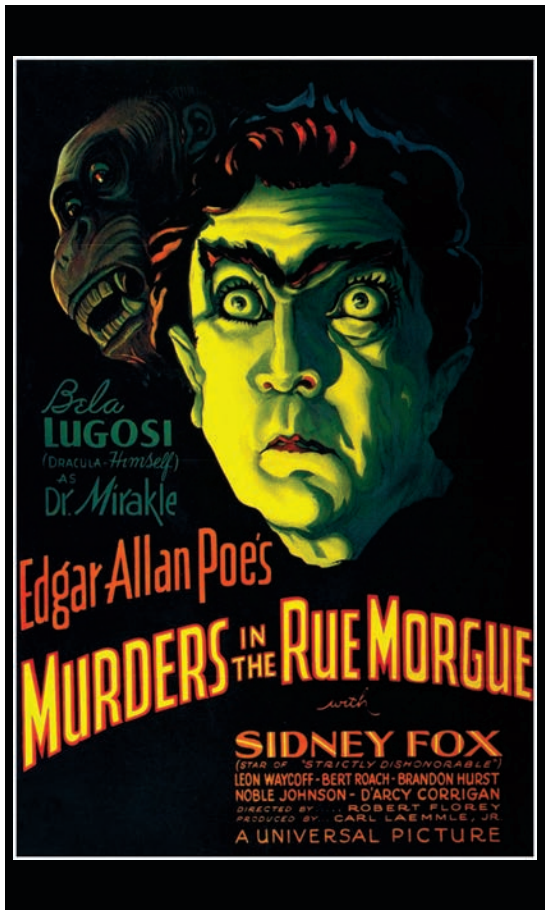
Murder?

Walsh[2] advanced his own belief that Poe was murdered. According to him, Poe was likely set upon in Philadelphia by Elmira's three brothers. When Poe proceeded on to Baltimore, the trio attacked him again, forced him into drunkenness, and perhaps even put out the cooping story as a diversion. But why would the brothers do all this? Their motive was supposedly their opposition to Poe marrying their widowed, and quite wealthy, sister.

Supposedly there existed elements that Walsh could marshal into such a scenario. Poe had had a bad feeling about his trip. On his journey, he twice heard men seated behind him talking about killing him (Walsh 2000, 71–73, 77–83). Much is made of Poe hanging out at Ryan's Tavern, where his attackers plied him with drink. (Actually, it was just an old country inn.) He babbled a "dying message" about someone named Reynolds and was found on the street in a "manic" condition. When questioned, his answers were unsatisfactory (Symons 1978, 153).

But there were more strange elements. Poe wore a hat that belonged to someone else (Dawidziak 2023, 143). Previously, at times he had been "hallucinatory" and "suicidal" (Walsh 2000, 36–67, 75–83; Edwards 2022, 20–21). This seems not to sound like a murder story. There were still more bizarre factors. The reference to Reynolds in Poe's delirium seemed only to name Jeremiah Reynolds, who inspired Poe's story about Arthur Gordon Pym's final and mysterious end (Walsh 2000, 122–123). A doctor was adamant that Poe did not suffer from intoxication. And he had no trouble swallowing, so his illness was not rabies (Dawidziak 2023, 183, 187).

Critics and historical sleuths have long attempted to solve Poe's last mystery: that of his own death. I have, I believe, now discovered in all the strangeness several real clues that suggest a new possibility. Taken together they are symptomatic of a disease that can take many different forms and was not so well known in Edgar Allan Poe's time. Today, we know it as Parkinson's disease or as a group of similar disorders called parkinsonism.



Toward a New Poe Theory

Parkinsonism is any of a group of serious nervous disorders tending to occur after the onset of middle age. It is associated with brain cells that in their destruction produce dopamine in the brain. The result affects the central nervous system, tending to yield slow movement, muscular tremor, partial facial paralysis, and sometimes a peculiarity of posture and gait. However, the variations of symptoms are numerous, and different people may be affected differently. For example, "In his addled state, Poe was likely combining vivid hallucinations with actual hazy memories" (Dawidziak 2023, 29).

In earlier times, Parkinson's production of hallucinations was not so well known, but that element can be seen in Poe's visualizations of shadowy killers and the like. These are internal rather than external sources. Also, retroactive diagnosis of Parkinson's is highly indicated by Poe's tremors being mistaken for *delirium tremens*. In 1849, Poe had extreme mood swings, "dark forebodings" as he said, in fear he might be killed. Recall that Poe had overheard men planning to murder him: Hallucination surely! The disease is named for English doctor James Parkinson who described it in his *An Essay on the Shaking Palsy* (1817) ("Parkinson's Disease" 2023).

We can now understand how Poe was seen "moving rather stiffly" or how he appeared to have a "fit of *delirium tremens*, complete with visions" (Walsh 2000, 1–2). Again, we might see how he would move from a wonderful performance to a "weary and despondent arrival" (Walsh 2000, 19–20) or be found "laboring under an attack of *mania a potu*, and in a most shocking condition" (Walsh 2000, 36). Yet again, he was described with "tremor of the limbs … or active delirium … and vacant converse with spectral and imaginary objects on the walls" (qtd. in Walsh 2000, 41).

Poe was once stuck in a "stooping position" (Dawidziak 2023, 124), which was likely caused by Parkinson's (see "Parkinson's Disease" 2023). Sometimes people claimed Poe had been drinking although they had not witnessed the fact. In so many other ways could Poe's Parkinson's have given a very mistaken idea. For instance, the final blow to his head was less likely from an attacker or a "drunken fall" (Walsh 2000, 116) than a fall caused by his Parkinson's—which possibility no one apparently ever considered. The same may be said of an instance of Poe's inability to walk (Walsh 2000, 44) and instances of other such states and events (Walsh 2000, 44–56).

The new theory of what probably caused many of Edgar Allan Poe's reported behavioral elements during his final five days—his hallucinations, notable tremors, and so on—as being caused not by drink but by Parkinson's disease should cause major revisions in Poe's biography. It should indeed replace the excessive disparagement of Poe's final years with a more truthful, insightful, and respectful portrait of this important American genius. It is a solved mystery of great consequence. ■

What You Last Saw (To Edgar Allan Poe)

JOE NICKELL

How ill you were
        at the last
we now know,
though
        not
        what
        might
have passed
        your eyes
& been
        recognized:
a woman
        you long knew,
perhaps, or a raven
        that noisily flew,
or even
some demon
        that chanced
        your glance,
& grew
        full
        in your final
view.

Notes

1. Vidocq rose from petty criminal to police informer to undercover operative to the founder of the French Sûreté Nationale in 1811. He is also credited with creating the first private detective agency. Vidocq published his ghost-written memoir in 1829, popularizing the proverb "set a thief to catch a thief" (Morton 2012).

2. Walsh (1963) was an erstwhile promoter of the authenticity of the Turin Shroud.

References

Benet's Reader's Encyclopedia, third edition. 1987. New York, NY: Harper & Row.

Cestre, Charles, and Thomas Ollive Mabbott. 1960. Edgar Allan Poe. *Encyclopædia Britannica*, 18: 103, 104.

Dawidziak, Mark. 2023. *A Mystery of Mysteriès: The Death and Life of Edgar Allan Poe*. New York, NY: St. Martin's.

Edwards, Martin. 2022. *The Life of Crime: Detecting the History of Mysteries and Their Creators*. London, UK: Collins Crime Club.

Geiling, Natasha. 2014. The (still) mysterious death of Edgar Allan Poe. *Smithsonian Magazine* (October 7). Online at https://www.smithsonianmag.com/history/still-mysterious-death-edgar-allan-poe-180952936/.

Morton, James. 2012. *The First Detective: The Life and Revolutionary Times of Vidocq: Criminal, Spy, and Private Eye*. New York, NY: Overlook Press.

Nickell, Joe. 2010. Historical whodunit: Spiritualists, Poe, and the real "Marie Rogêt." Skeptical Inquirer 34(4) (July/August): 45–49.

Parkinson's disease. 2023. Online at https://en.wikipedia.org/wiki/Parkinson%27s_disease#Pathophysiology; accessed September 2.

Shanks, Edward. 1937. *Edgar Allan Poe*. New York, NY: The Macmillan Co.

Symons, Julian. 1978. *The Tell-Tale Heart: The Life and Works of Edgar Allan Poe*. New York, NY: Penguin.

Walsh, John [Evangelist]. 1963. *The Shroud: The Authoritative and Dramatic Account of the Most Remarkable Relic in the Christian World*. New York, NY: Random House.

———. 2000. *Midnight Dreary: The Mysterious Death of Edgar Allan Poe*. New York, NY: St. Martin's Minotaur.

[THE PHILOSOPHER'S CORNER MASSIMO PIGLIUCCI

Massimo Pigliucci is the K.D. Irani Professor of Philosophy at the City College of New York. His academic work is in evolutionary biology, philosophy of science, the nature of pseudoscience, and practical philosophy. His books include *Nonsense on Stilts: How to Tell Science from Bunk* and *Philosophy of Pseudoscience* (coedited with Maarten Boudry). More by him at http://newstoicism.org/.

Pseudoscience: An Ancient Problem

Remember CSICOP? The Committee for the Scientific Investigation of Claims of the Paranormal was the forerunner of the current CSI, the Committee for Skeptical Inquiry, that publishes the very magazine you are reading. CSICOP was launched by Paul Kurtz, Marcello Truzzi, and others on April 30, 1976. And the rest, as they say, is history.

Just the year before that momentous event, Kurtz spearheaded a public campaign against astrology by publishing a manifesto cowritten with Bart Bok and Lawrence E. Jerome, endorsed by 186 scientists (including nineteen Nobel laureates), and published in *The Humanist*, the organ of the American Humanist Association. The very first target of the new skeptic movement was, in other words, the broad practice of predicting the future by nonscientific means. And the approach deployed by the signatories of the manifesto was to spell out several criteria that demarcate science from pseudoscience.

And yet the problem of demarcation, together with criticism of what we nowadays refer to as *pseudoscience*, was far from new. Indeed, the first known example in history is *On Divination*, a book written by the ancient Roman orator, public advocate, statesman, and philosopher Marcus Tullius Cicero in 44 BCE, the same year Julius Caesar was killed.

There are some striking similarities between Cicero's approach to demarcation and the one used by modern philosophers of science, as clearly articulated in a wonderful paper by my colleague Damian Fernandez-Beanato (2020), which I highly recommend for the lucidity of the analysis and the relevance to modern skepticism.

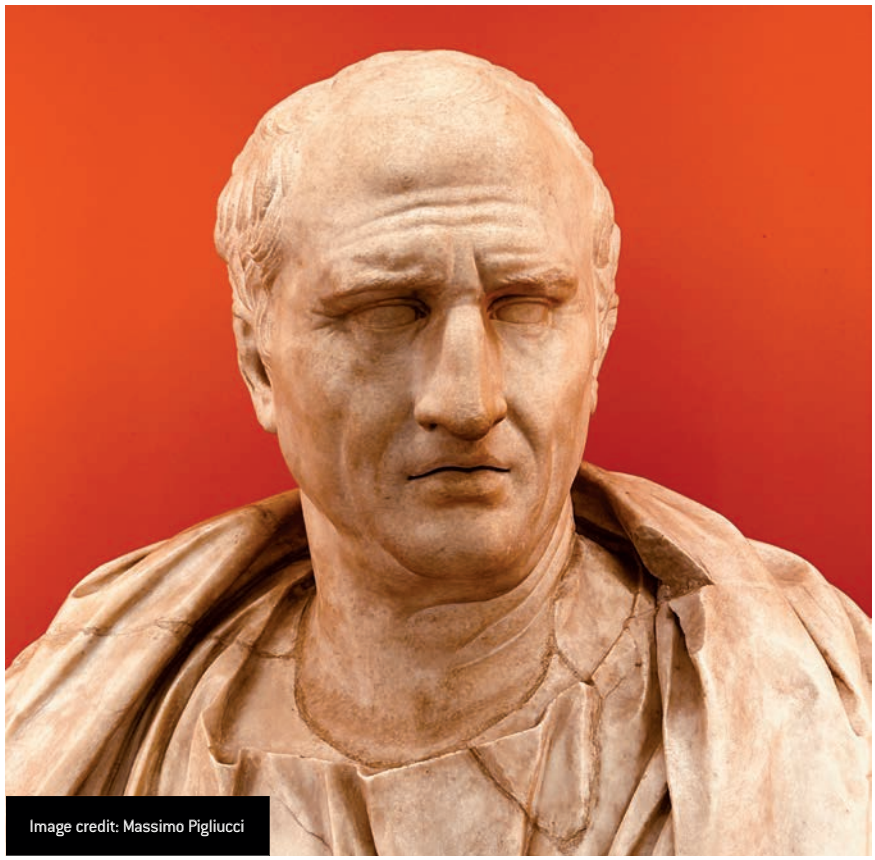


Image credit: Massimo Pigliucci

The target of Cicero's criticism was a broad array of practices of divination, including those based on reading the entrails of animals, interpreting the flights of birds, drawing astrological charts, and deciphering dreams. Cicero's general definition of divination was "foresight and knowledge of future things" by nonordinary means, as distinct, for instance, from astronomy, where it is possible to predict celestial events such as eclipses and the movements of planets by ordinary means of scientific investigation.

Cicero contrasted the sort of practices that fall under the umbrella of divination with those comprised by *scientia*, a word that obviously has the same root as our modern word *science*, yet had a more extensive connotation, similar to the German *wissenschaft*, meaning scholarship and inquiry in both the sciences and humanities.

His main target of criticism was rather surprising: the Stoic school. This may appear odd because the Stoics were arguably among the most reason-based and empirically minded of the ancient philosophical schools. Yet they endorsed divination. Why? Because they thought that everything in the universe is made of matter, that only matter has causal powers, and that therefore everything that happens is the result of a cosmic pattern of cause and effect. If this is true, then it stands to reason that by examin-

ing a portion of this cosmic pattern, we ought to be able to infer the structure of other portions, thus being able to reconstruct the past or predict the future. This is far from being silly; it's actually the way modern science works. It's just that modern scientists are, shall we say, a bit more discriminating about which portions of this cosmic pattern of cause and effect are worth focusing on.

Cicero himself belonged to a different school of philosophy, known as the Skeptical (or New) Academy. It was a development of the Academy originally founded by Plato, but with a skeptic twist. *Skeptic* is something very much akin to the modern sense of the term: the Academic Skeptics thought that human beings are fallible and the best we can do in our quest for knowledge is to arrive at *probabilities* (a word invented by Cicero) to estimate the likelihood that a given notion is or is not true. As Cicero himself put it in *On Divination*: "As I fear to hastily give my assent to something false or insufficiently substantiated, it seems that I should make a careful comparison of arguments. … For to hasten to give assent to something erroneous is shameful in all things."

Cicero's description of divination corresponds well with my own definition of *pseudoscience* (Pigliucci and Boudry 2013), and just as is the case for several modern skeptics, he did not pull punches and referred to it as an "incredible delirium." Just like modern scholars, Cicero demanded that a hypothesis be both internally consistent and backed up by empirical evidence to be considered seriously, and divination surely didn't qualify.

Let us get a bit into the meat of *On Divination* to appreciate just how modern and still very much useful that treatise is today. Beanato identifies the following criteria being invoked by Cicero to demarcate sense from nonsense:

1. Internal logical consistency;
2. Empirical confirmation;
3. Specificity of proposed causal mechanisms;
4. Degree of arbitrariness (the less the better); and
5. Existence of a qualified, nonarbitrary community of experts.

One of the things that makes this list so stunningly modern is that it is a mix of three categories of entries: the first criterion is logico-theoretical, because it demands internal coherence even before we begin to assess the empirical content of a given hypothesis. If it makes no sense, there is no point in searching for evidence for or against.

Criteria two through four are empirical-theoretical and mutually reinforcing. None of them is sufficient by itself to separate a proper science from pseudoscience, but when all are taken together, things begin to look much clearer. For instance, modern string theory in physics has (currently) no empirical confirmation, and yet nobody thinks of it as pseudoscience. That's because it does well on criteria three and four within this group, as well as on criteria one and five. Or consider the theory of continental drift initially proposed by Alfred Wegener in a paper published in 1912. We had to wait until 1968 for the geological community to take the idea on board, because the initial version was lacking criterion three, a causal mechanism.

Finally, criterion five is arguably the most modern of them all, because it is sociological in nature. Philosophers of science such as Helen Longino (1990) have long recognized that science, qua human activity, is characterized by more than just logical, theoretical, and empirical criteria. It is something carried out by a properly functioning community of epistemically competent people, working within institutional frames and practices, such as peer review, specialized journals, conferences, graduate programs, academic professorships, and the like. While none of that existed in Cicero's time, he nevertheless understood that proper *scientia* is practiced by a nonarbitrary group of competent people, and that astrologers did not qualify because—their claims notwithstanding—they had no special competence. Analogously, Deepak Chopra says he's an expert in quantum mysticism, but there simply is no such thing as expertise in quantum mysticism.

Beanato's analysis of *On Divination* goes on to highlight a large number of other objections Cicero raises against astrology and associated practices, objections that still resonate today. For instance, astrologers are ignorant of the geographic variability of the positions of the stars; often two animals are sacrificed in succession, and an examination of their entrails provides contradictory predictions; people have the same dreams and yet subsequently experience different events; siblings ought to share the same fate and yet often don't; people have a strong capacity to fool themselves; sometimes predictions come true, but more often they don't; often predictions are conveniently vague; frequently interpretations of "predictions" are actually provided after the fact; people sometimes just lie and cheat; mechanisms to explain the causal connection between current signs and future events are not provided; celestial objects are too far away to influence human activities; divinators ignore more pedestrian explanations of events couched in human or natural terms; and divinators cherry pick successful cases while opportunistically ignoring unsuccessful ones.

Cicero ends up outlining a convincing distinction between astrology and astronomy that remains valid in the twenty-first century. Such demarcation is not based on a single criterion or on compact, sharp definitions of science and pseudoscience. Rather, it is the result of a serious, in-depth philosophical analysis of the nature of human epistemic activities. *On Divination* isn't just historically valuable; it is an excellent and still practical example of how to study pseudoscience in general. It is also a very good argument in favor of a renewed broadening of the term *science* along the lines of *scientia* and *wissenschaft*, because the real demarcation is not between science and the humanities but between serious inquiry and wishful thinking. ■

References

Beanato, D.F. 2020. Cicero's demarcation of science: A report of shared criteria. *Studies in History and Philosophy of Science* 83: 97–102.

Longino, Helen E. 1990. *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry*. Princeton, NJ: Princeton University Press.

Pigliucci, M., and M. Boudry. 2013. *Philosophy of Pseudoscience: Reconsidering the Demarcation Problem*. Chicago, IL: University of Chicago Press.

[BEHAVIOR & BELIEF STUART VYSE

Stuart Vyse is a psychologist and author of *Believing in Magic: The Psychology of Superstition*, which won the William James Book Award of the American Psychological Association. He is a fellow of the Committee for Skeptical Inquiry.

The Mozart Effect Lives On

Every now and again it's worth looking back at old unsupported ideas that we thought were dead and buried because, like zombies, they sometimes climb out of their graves and stagger into the future. So, when I came across a recent mention of Wolfgang Mozart in a psychological study, I was not entirely surprised by what I dug up.

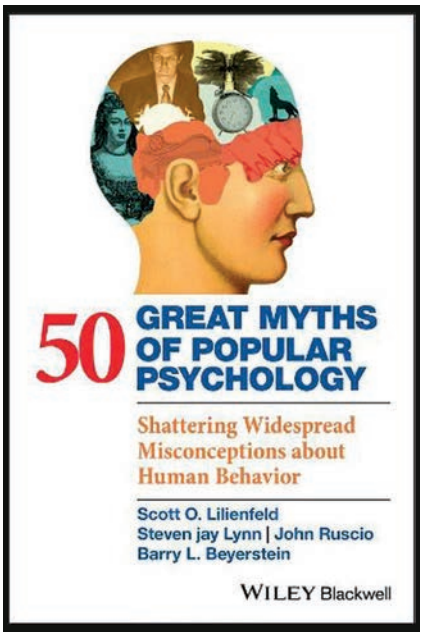
Back in 1993, three University of California, Irvine, psychologists published a study in *Nature*, one of the world's most prestigious science journals, showing that college students who listened to ten minutes of Mozart's sonata in D for two pianos, K. 448, performed significantly better at a spatial reasoning test than when they heard a relaxation tape or silence (Rauscher et al. 1993). Because spatial reasoning is a component of IQ, the authors calculated that the improved performance was equivalent to an eight- to nine-point improvement in spatial IQ. Before long, the media got wind of the Mozart study, and things got crazy.

In an extreme case of journalistic overreach, many articles were published suggesting that listening to Mozart could make babies smarter. Musician Don Campbell (1997) wrote a popular book *The Mozart Effect: Tapping the Power of Music to Heal the Body, Strengthen the Mind, and Unlock the Creative Spirit*, and thousands of Mozart Effect CDs were sold. In 1998, Georgia Governor Zell Miller went so far as to add $105,000 to the state budget so that each newborn child in Georgia could be issued a cassette tape of Mozart music free of charge (Lilienfeld et al. 2009).

All this happened despite a few obvious points: The participants in the original study were college students, not babies, and the authors admitted that the effect they observed was temporary, lasting only ten to fifteen minutes. To make matters worse, several efforts to replicate the original effect were unsuccessful, and meta-analyses summarizing the results of many studies of the Mozart Effect found that the estimated effect was restricted to spatial reasoning and was much smaller than originally suggested. For example, Christopher F. Chabris of Harvard University found that "this enhancement is essentially re-

stricted to a single task, is one-quarter as large as that originally reported for a broader class of cognitive abilities, is not statistically significant, and is smaller than the average variation of a single person's IQ-test performance" (Chabris et al. 1999, 826). *Poof!* No more Mozart Effect.

Given this conclusion to the story, CSI Fellows Scott O. Lilienfeld and Barry L. Beyerstein, with coauthors Steven Jay Lynn and John Ruscio, listed the Mozart Effect as a myth in their book *50 Great Myths of Popular Psychology: Shattering Widespread Misconceptions about Human Behavior* (Lilienfeld et al. 2009), and most of us thought the issue was settled.


50 GREAT MYTHS OF POPULAR PSYCHOLOGY
Shattering Widespread Misconceptions about Human Behavior
Scott O. Lilienfeld
Steven jay Lynn | John Ruscio
Barry L. Beyerstein
WILEY Blackwell

The Zombie Awakens

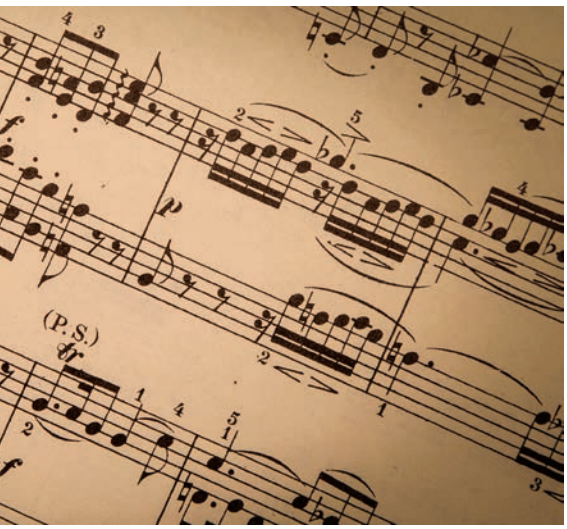
The recent mention of Mozart that drew me back to the topic was a relatively trivial case. A notice on the Retraction Watch website mentioned that Springer Nature had removed the word *Mozart* from the title, abstract, and third paragraph of an article published in the open access peer review journal *Pediatric Research* (Anbalagan et al. 2023). The article, now titled "Music for Pain Relief of Minor Procedures in Term Neonates," claimed that playing music may help reduce the pain experienced by newborn babies undergoing a heel prick blood test. The post-publication edits removing the word *Mozart* from the article were necessitated by the late discovery that the authors could not verify that the music in the YouTube video they used in the study, "Bedtime Mozart," actual contained compositions by the composer himself (Feldwisch-Drentrup 2023). This is a rather trivial point, but it may be evidence of the intoxicating appeal of the name Mozart. I will return to this question later.

My look back at the Mozart Effect revealed something far more substantial than just an ambiguous YouTube video. As I searched the literature, I discovered that the magic of Mozart continued to be studied in contexts other than intelligence. In particular, there has been a burst of studies claiming that listening to the same piece by Mozart—sonata in D for two pianos, K. 448—reduces the effects of epilepsy. The weirdly specific nature of the claim was supported by a study that appeared to show that listening to Haydn's Symphony No. 94 actually *exacerbated epilepsy* rather than reducing it (Maguire 2022). Furthermore, a 2020 meta-analysis of studies of the effects of listening to the Mozart sonata found a significant reduction in interictal epileptiform discharges—a wave form observed between seizures in patients with epilepsy—when measured by electroencephalogram (EEG; Sesso and Sicca 2020). The authors concluded that music therapy "should be considered as a complementary, non-invasive approach for treating epilepsy and epileptiform discharges" (Sesso and Sicca 2020, 1610). But this isn't the end of the story.

In March 2023, a new meta-analysis of the Mozart Effect and epilepsy was published in *Scientific Reports* by two researchers from the University of Vienna (Oberleiter and Pietschnig 2023).[1] As mentioned in a previous column, *Scientific Reports* is an open access peer reviewed journal that requires authors to pay a manuscript processing fee prior to publication (Vyse 2023). Although we should be a little skeptical of open access journal publications, this particular article has some strengths that give me greater confidence in the results. In particular, the Vienna meta-analysis was a pre-registered study, which means that the authors stated publicly what they were up to and what methods they planned to use before collecting any data. Any changes that they made along the way were reported online, and all the data was posted on a website for anyone to examine or reanalyze. This adherence to the new, more rigorous standards of the open science initiative (https://www.cos.io/) gives me greater confidence in their results.

Sandra Oberleiter and Jakob Pietschnig (2023) set up several criteria for including studies in their meta-analysis, and when studies were excluded, it was because researchers failed to use a control group to compare to the Mozart group, failed to used empirical measurement methods, and/or did not provide adequate statistics to allow for the re-analysis of the original data. When the raw data from a particular Mozart study were not available, Oberleiter and Pietschnig wrote to the authors in an effort to obtain the original figures. The resulting analysis included eight studies with a combined group of 207 participants—and the results were not good for the Mozart Effect.

After conducting many very sophisticated tests on the data from the eight surviving studies, the authors concluded: "In all, our meta-analysis shows that there is no meaningful support for a beneficial effect of listening to Mozart's sonata KV448 on any medically relevant conditions, let alone a specific Mozart effect for epilepsy. Unfounded authority, underpowered studies, and non-transparent reporting appear to be the main drivers of the Mozart effect myth" (Oberleiter and Pietschnig 2023, 13).

The mention of "non-transparent reporting" refers to the fact that, even after writing to the authors, Oberleiter and Pietschnig were unable to obtain raw data from most studies that showed a positive effect of Mozart's music. They made no assumptions about the quality of those studies, but without the original data, it was impossible to verify the published results. The lack of data was particularly surprising, because most of

the studies were published after 2010, at a time when the standards of the open science movement—including the practice of either publicly posting raw data or, at least, providing raw data on request—were widely known.

The Real Magic of Mozart

In a somewhat satirical piece reporting on the YouTube mix-up that started me on this journey, Hinnerk Feldwisch-Drentrup (2023) of the *Frankfurter Allgemeine Zeitung* identified the true Mozart Effect (translation by Google): "However, the following Mozart effect is plausible: the use of his name increases media attention." Mozart is one of those mononyms, like Einstein or Beethoven, that is synonymous with genius. It is not a surprise that the company Baby Einstein with its collection of educational programs for infants and toddlers has the name it does. As much as I love the music of Gustav Mahler, the "Mahler Effect" or "Baby Mahler" just wouldn't have the same ring.

I will save a discussion of Baby Einstein for another day or another writer, but it should be noted that back in 2006, the advocacy group Campaign for a Commercial-Free Childhood brought a complaint against Baby Einstein to the Federal Trade Commission (FTC) alleging that the company had made false claims in its advertising (Federal Trade Commission 2007). After an investigation, the FTC closed the case but only after Baby Einstein removed several testimonials and other advertising claims from their website. Correlation does not imply causation, but it appears that the use of names synonymous with genius in research or commerce is correlated with making unsupported claims. *Caveat emptor*. ■

Note

1. My nonscientific review of the literature revealed an overrepresentation of Mozart Effect researchers from Vienna, Austria, where Mozart lived and died.

References

Anbalagan, Saminathan, Juan H. Velasquez, Denisse Staufert Gutierrez, et al. 2023. Music for pain relief of minor procedures in term neonates. *Pediatric Research* (August 29): 1–5. Online at https://doi.org/10.1038/s41390-023-02746-4.

Campbell, Don. 1997. *The Mozart Effect: Tapping the Power of Music to Heal the Body, Strengthen the Mind, and Unlock the Creative Spirit*. New York, NY: Avon Books.

Chabris, C.F., K.M. Steele, S. Dalla Bella, et al. 1999. Prelude or requiem for the 'Mozart Effect'? [5] (multiple letters). *Nature* 400(6747): 826–828.

Federal Trade Commission. 2007. The Baby Einstein Company, LLC. (December 5). Online at https://www.ftc.gov/legal-library/browse/cases-proceedings/closing-letters/baby-einstein-company-llc.

Feldwisch-Drentrup, Hinnerk. 2023. Mozart-Effekt: Angebliche Wunderwirkung Auf Babys MIT Schmerzen. FAZ.NET (August 29). Online at https://www.faz.net/aktuell/wissen/medizin-ernaehrung/mozart-effekt-angebliche-wunderwirkung-auf-babys-mit-schmerzen-19134866.html.

Lilienfeld, Scott O., Steven Jay Lynn, John Ruscio, et al. 2009. *50 Great Myths of Popular Psychology: Shattering Widespread Misconceptions about Human Behavior*. Hoboken, NJ: John Wiley & Sons.

Maguire, Melissa Jane. 2022. Wired for sound: The effect of sound on the epileptic brain. *Seizure* 102: 22–31.

Oberleiter, Sandra, and Jakob Pietschnig. 2023. Unfounded authority, underpowered studies, and non-transparent reporting perpetuate the Mozart Effect myth: A multiverse meta-analysis. *Scientific Reports* 13(1): 1–16.

Rauscher, Frances H., Gordon L. Shaw, and Catherine N. Ky. 1993. Music and spatial task performance. *Nature* 365(6447): 611.

Sesso, Gianluca, and Federico Sicca. 2020. Safe and sound: Meta-analyzing the Mozart Effect on epilepsy. *Clinical Neurophysiology* 131(7): 1610–20.

Vyse, S. 2023. Can we trust peer review journals? Skeptical Inquirer 47(4), 24–27.

Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON

Skeptical Inquirer is now available for digital-only subscription.

Current print subscribers have full digital access to our online articles and archives. Print subscribers can access the digital content by visiting skepticalinquirer.org, then clicking "Activate" in the top-right corner of your screen. Our digital content is viewable on any device.

Consider giving a gift subscription to a young person you know who might appreciate Skeptical Inquirer's content but prefers to read on a digital device—or to a friend overseas.

[THE PRACTICAL SKEPTIC MICK WEST

Mick West is a writer, investigator, and debunker who enjoys looking into the evidence behind conspiracy theories and strange phenomena and then explaining what is actually going on. He runs the Metabunk forum and is the author of the book *Escaping the Rabbit Hole*.

What Happened to Chemtrails?

The chemtrails conspiracy theory holds that the long white lines you sometimes see forming and spreading out behind aircraft are actually a secret form of government spraying. This was a somewhat popular conspiracy theory for discussion up until around 2018. But you don't hear much about it now, despite planes leaving the exact same trails (just condensation, basically clouds) in the sky. What happened?

I have long been fascinated by the chemtrails theory, having first heard about it way back in 2007. I'd been doing some research into a disputed medical condition called Morgellons when I noticed that some people in an online forum kept bringing up this thing called "chemtrails."

Morgellons was a self-diagnosis that a few worried people sought out when their regular doctors were unable to cure their symptoms. It involved small fibers that were thought to emerge from the skin as part of the "disease." In reality, the fibers people were finding were ordinary misidentified things such as hair, cotton, or paper fibers. But the visual confirmation of their suspicions seemed to be something people latched onto.

The Morgellons community was very diverse. While most had genuine symptoms of unknown cause, their fixation on the "fibers" as being related made their condition indistinguishable from delusions of parasitosis. It was a very eccentric community.

So, when I first heard chemtrails mentioned on a Morgellons board, it came with that eccentric baggage. The very early versions of the theory suggested that the government was spraying something to try to control the population—perhaps some thought-control drug, something for population reduction, or, in the more extreme versions, bioengineered "nano-worms" that gave people Morgellons and then wiggled out of their skin.

One typical post from 2008 on a Morgellons discussion board explained:

> As to how the stuff is actually getting in the water in the first place, my suspicions would primarily focus on chemtrails. The skies are being sprayed continually with a toxic brew of particulates and contaminants. All this stuff eventually drifts earthward, is inhaled into our lungs, and falls into our rivers, lakes, reservoirs, and in the ocean. Since much of the chemtrail toxins are nano-sized they cannot be filtered out. It would make sense that the stuff in the chemtrails is showing up in the water supply.

This characterization of chemtrails as some strange biological or toxic spraying campaign was a common idea back then. While chemtrails enjoyed a brief period of coverage on local news channels desperate for content, the "spraying toxins" theory became the default interpretation in the public mind.

But it did not stay the default explanation for long. By 2009, the "chemtrails" theory had been around for over a decade and was ripe for selection as an explanation for whatever ailed you (see Thomas 2008; Radford 2009).

Geoengineering

What ailed Dane Wigington was that his solar panels were not producing as much energy as he had hoped. Wigington had just retired to Redding, in northern California. He'd bought 2,500 acres of land on which to build his dream home. Hoping to be fully off the grid, he installed a large array of solar panels (Wigington 2007). Like many such installations, the promised numbers are best-case scenarios, and

he was a bit unhappy that his panels seemed to be underperforming. So, he looked for a culprit.

His new home was directly under a very busy air corridor; every day there were hundreds of high-altitude flights between California to the south and Oregon, Washington, and western Canada to the north. On days with high humidity at flight altitudes, those planes would leave persistent contrails that sometimes spread out to cover the sky.

Such contrails are normal and expected. They reduce solar production by as much as 5 percent on a particularly contrail-heavy day (Mims and Travis 1997). This is not deliberate, just a side effect of global aviation.

What in the World Are They Spraying?

Wigington felt it was deliberate. He discovered the chemtrails conspiracy theory but was not taken in by the extreme stories of poison, population control, or nano-worms. Instead, he settled on what has become the most popular interpretation of "chemtrails"—that they are part of a secret climate control plot using geoengineering.

Things really took off in 2010 when Wigington teamed up with old-school conspiracist G. Edward Griffin and 9/11 theorist Michael J. Murphy to create a documentary about their theory titled *What in the World Are They Spraying?*

In this documentary, Wigington told Murphy his theory that the trails were not contrails but were "chemtrails" designed for geoengineering—a way of altering the climate by spraying particulates into the air. They were still toxic, but, in this version, the toxicity was just a side effect of the attempts to control the climate.

This idea caught on. The documentary was slick and acted as a "red pill" introduction to chemtrails for many people. It was distributed on DVD and given away free online. Back then, if you searched for "chemtrails" on YouTube, you would find their documentary. In 2012, they released a sequel. It was peak chemtrails.

Where Did They Go?

The chemtrails theory does not currently *seem* very popular. Google Trends reveals a strong surge in interest sustained from 2010 until about 2018. Then things drop away. A recent spike in 2021 was just due to Lana del Rey releasing an album titled *Chemtrails over the Country Club*. I also haven't responded much with chemtrails claims over the past few years, largely because nothing new came up. It very rarely seemed to surface on social media. It seemed like it had gone away. So, what happened?

A few of the key players are no longer with us. Michael J. Murphy passed away in 2020. I'd had dinner with him a few years earlier, and he seemed very earnest but also not very familiar with the actual science. Another star of the documentary, Rosalind Peterson, also passed away shortly after it was released.

But others are still going strong; Dane Wigington still publishes geoengineering theories on his website on a regular basis. G. Edward Griffin has moved on to anti-vaccine conspiracies, but he's still quite active.

A part of the reason we don't hear about chemtrails despite the continued efforts of activists is that big tech does not want you to hear about it. Their documentaries no longer pop up in YouTube search results. A Google search returns only debunking pages (and music videos). Is it a cover-up?

Sort of. In 2019, I flew to New York to take part in a discussion with a consulting company working with a major social media company. I talked about how so many conspiracists found their way down the rabbit hole by watching a video on social media. A corporate representative was there, and he told me that was something they wanted to stop. They gave two reasons for their

Image credit: Leonid - stock.adobe.com

decision. First, preventing the spread of conspiracy theories seemed to be a good thing to the executives. Second, they found it made financial sense because many conspiracy theories were topics that advertisers did not want their products associated with. It was not clear to me which of those two reasons was paramount.

This was already in progress, and by 2020, conspiracy content, including chemtrails, had greatly been suppressed on social media—especially on YouTube. This led to a great decline in visibility and then to a decline in interest. It seemed, for a while, that it was working.

Recurrence

But chemtrails had become established in the conspiracy world. Over the twenty-five years the theory has been around, it developed into a self-sustaining mythology. A series of claims of evidence that had been conclusively debunked many times in the past became a series of accepted facts.

The rise of dynamic conspiracies in the 2020s, particularly QAnon, includes a lot of older theories by default. They are not given much thought, because they are old, but they are nevertheless accepted as reality. Thus, any good QAnon believer will *know* that John F. Kennedy Jr. was killed by the CIA. They *know* that 9/11 was an inside job. They have no doubt that climate change is a scam, and they will have no problem at all believing that chemtrails are a secret spraying plot by the government.

Old-fashioned conspiracists such as Dane Wigington would believe a wide range of conspiracies, but they tend to focus on one thing, such as chemtrails, and stick with it for decades. Modern conspiracists are much more flexible, jumping from one new thing to another but with a solid foundation of traditional conspiracy beliefs.

The chemtrails theory *seems* to have vanished because it's in the background. It's ceased to be a hot topic for debate and now is a foundational belief that conspiracists feel needs no real discussion because everyone (that they know) thinks it's true.

But it's still there. The old players are still there. In June 2023, the old and (somewhat) new world collided when current presidential candidate Robert F. Kennedy Jr. appeared on Wigington's YouTube podcast to discuss chemtrails. While Kennedy was a little cautious, he gave Wigington an incredible boost with his endorsement. At one point, he explained how Woody Harrelson got him interested in chemtrails:

> One of the reasons that … my mind is open to this is because Woody Harrelson one time was at my house, and he was talking about this (this is probably ten years ago), and I was saying, come on, that's just that's ridiculous. That's impossible. And he said, come outside with me. And we went outside, and we sat on a hillside. And we watched these planes fly in a grid pattern, laying out this, you know, grid of contrails. And then it turned into clouds, and we had a cloudy day. (Kennedy 2023)

Wigington has been plugging along, just releasing his four hundredth "Global Alert News," where he's been predicting imminent disaster for many years. His videos don't show up under the label *chemtrails*, but somehow they *do* show up under *geoengineering*, so his audience size remains healthy. Just because you don't hear much about a conspiracy theory does not mean it has gone away. It might, like in this case, mean that the theory has evolved from something that's actively discussed and debated into something that's become part of an accepted tapestry of false theories people use as the foundation of and justification for their more current false theories.

Chemtrails is in the background, but it's still there and still needs addressing. ■

References

Kennedy, R.F., and D. Wigington. 2023. Is Climate Engineering Real? (video) (June 7). Online at https://www.youtube.com/watch?v=bqSkbHKSnjI&t=2814s.

Mims, F. M., and D.J. Travis. 1997. Aircraft contrails reduce solar irradiance. Eos, Transactions American Geophysical Union 78(41): 448. Online at https://doi.org/10.1029/97EO00281.

Radford, Benjamin. 2009. Curious contrails: Death from the sky? Skeptical Inquirer 33(2) (March/April).

Thomas, Dave. 2008. The 'chemtrail conspiracy.' *Skeptical Briefs* 18(3) (September).

Wigington, Dane. 2007. *Diminished Solar Charge Capacities Due to Persistent Jet Contrails*. Agriculture Defense Coalition (August 11). Online at https://bit.ly/3M2qLBN.

[THE TIME WARP: SKEPTICISM REVISITED—FROM THE FUTURE

CRAIG A. FOSTER, MCKENNA DUFF, PAIGE HATFIELD

Craig A. Foster is a CSI fellow and director of research and evaluation at Northshore School District in Bothell, Washington. McKenna Duff is pursuing a master's degree in social work at Hunter-Silberman School of Social Work. Paige Hatfield is pursuing a master's degree in mental health counseling at Butler University.

When Pseudoscience Dies: A Biorhythm Case Study

Welcome aboard friends! In "The Time Warp," we aren't constrained by the space-time continuum. We use Skeptical Inquirer's rich history to examine skepticism … from the future.

On this voyage, we travel to Spring/Summer 1978 to examine The Skeptical Inquirer Vol. 2, no. 2.

Some pop-culture beats to capture the tempo of the time: Paramount Pictures released *Grease*, starring John Travolta and Olivia Newton-John (June 16); Barry Manilow's "Copacabana" debuted (July 7); and the first test tube baby was born in the United Kingdom (July 25).

And *skeptical* was the word, the word that you heard. With this fourth issue, The Skeptical Inquirer became the journal's official title. The old title, *The Zetetic*, was relegated to the subtitle.

Editor Kendrick Frazier provided his first From the Editor, where he reaffirmed the journal's commitment to promoting scientific skepticism.

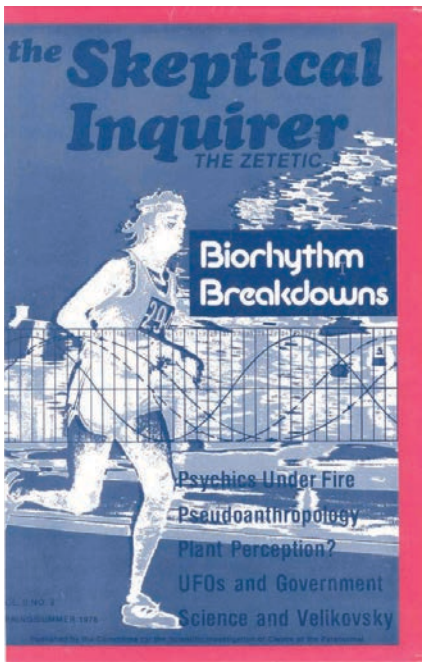
An announcement informed readers that The Skeptical Inquirer was moving from a semi-annual to quarterly publication, and the annual subscription rate for individuals would increase from $10 to $12.

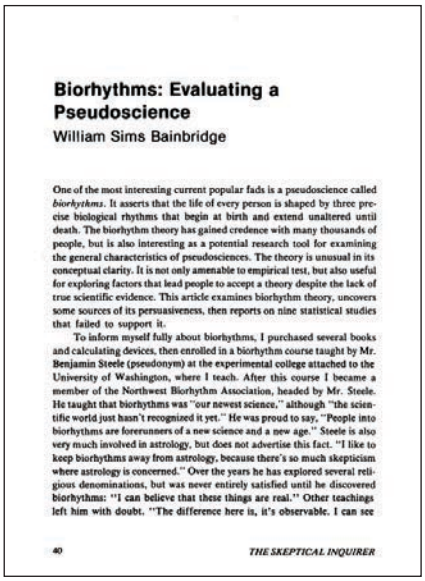
Some Skeptical Thoughts from the Time

James Randi examined whether supposed psychics could demonstrate their supernatural powers under controlled conditions. They couldn't.

John M. Kmetz shared the replication of two studies purportedly demonstrating that plants react to emotionally charged situations. The Kmetz replications did not detect this effect.

John R. Cole addressed the public's appetite for unsound claims masquerading as anthropology. Cole separated understanding the causes of paranormal claims from endorsing paranormal claims as objectively truthful.





Biorhythms: Evaluating a Pseudoscience

William Sims Bainbridge

One of the most interesting current popular fads is a pseudoscience called *biorhythms*. It asserts that the life of every person is shaped by three precise biological rhythms that begin at birth and extend unaltered until death. The biorhythm theory has gained credence with many thousands of people, but is also interesting as a potential research tool for examining the general characteristics of pseudosciences. The theory is unusual in its conceptual clarity. It is not only amenable to empirical test, but also useful for exploring factors that lead people to accept a theory despite the lack of true scientific evidence. This article examines biorhythm theory, uncovers some sources of its persuasiveness, then reports on nine statistical studies that failed to support it.

To inform myself fully about biorhythms, I purchased several books and calculating devices, then enrolled in a biorhythm course taught by Mr. Benjamin Steele (pseudonym) at the experimental college attached to the University of Washington, where I teach. After this course I became a member of the Northwest Biorhythm Association, headed by Mr. Steele. He taught that biorhythms was "our newest science," although "the scientific world just hasn't recognized it yet." He was proud to say, "People into biorhythms are forerunners of a new science and a new age." Steele is also very much involved in astrology, but does not advertise this fact. "I like to keep biorhythms away from astrology, because there's so much skepticism where astrology is concerned." Over the years he has explored several religious denominations, but was never entirely satisfied until he discovered biorhythms: "I can believe that these things are real." Other teachings left him with doubt. "The difference here is, it's observable. I can see

40 THE SKEPTICAL INQUIRER

Martin Gardner shared a letter authored by Albert Einstein. Einstein politely declined to write an introduction for the upcoming book *Telepathy and Medical Psychology*.

Philip J. Klass detailed the challenges government organizations face when addressing their alleged role in concealing UFO evidence. These challenges included President Jimmy Carter having once stated that he had seen a UFO. (An update on the case appears in the skeptical 2023 documentary *The UFO Movie THEY Don't Want You to See*; see the review in this issue).

Klass also wrote Columbia Pictures asking for the names of the many leaders and observers who reported UFO sightings according to a *Close Encounters* advertisement. Klass did not receive a response, but a subsequent movie advertisement omitted the dubious material. Klassic.

Woo-ty School Dropout

Our deep dive begins with William Sims Bainbridge's article, "Biorhythms: Evaluating a Pseudoscience," but not for reasons you might expect.

Previous Time Warps examining cattle mutilations (May/June 2023) and the Bermuda Triangle (September/October 2023) demonstrated that paranormal claims can survive for decades without legitimate support. Authorities still haven't found any satanic cow killers or interdimensional portals.

In contrast, people don't seem to care about biorhythms anymore. Was the demise of biorhythms a victory for skepticism? If so, what can skeptics learn from it?

Biorhythm theory claims that people have three internal performance cycles: a

twenty-three-day physical cycle, a twenty-eight-day emotional cycle, and a thirty-three-day intellectual cycle. At birth, these cycles start from a neutral point and move positively and then negatively in sinusoidal waves. Greater scores indicate greater capacity for corresponding performance.

Biorhythm theory also contends that critical days occur when any cycle is changing from positive to negative, or vice versa. Critical days tend to generate poorer performance due to the unpredictability of the internal energy.

Biorhythm popularity was clearly up in 1978. The cover of the SI issue was devoted to "Biorhythm Breakdowns." Bainbridge described biorhythms as a popular fad that generated countless books and products. An experimental college attached to the University of Washington even offered a course devoted to biorhythms.

Bainbridge promoted biorhythm theory in his own university course as part of an educational lesson. Bainbridge then solicited students about the legitimacy of biorhythms and some other pseudoscientific claims. The average student supported biorhythm theory as probably being true. Most students endorsed or partially endorsed "personalized" biorhythm results that had been distributed randomly, echoing the so-called Barnum Effect.

Bainbridge and his students then tested biorhythm theory using publicly available information involving birthdays, golf performance, baseball performance, dying, and giving birth. Bainbridge also examined student birthdays and classroom test performance privately. None of the results supported biorhythm theory.

Of course, Bainbridge's article didn't stem the tide of biorhythm buffoonery. But what goes up must come down, as the saying goes. Judging by the products and publications devoted to biorhythms, biorhythm belief eventually faded and seemingly died as a legitimate pseudoscience sometime in the late 1990s.

To be fair, pronouncing biorhythm theory dead involves poetic license. An online search can still find biorhythm calculators and biorhythm books. At the same time, it is probably unreasonable to expect any once-popular pseudoscience to go radio silent in today's digital era.

To that point, we believe four factors contributed to biorhythm's clinical death.

First, biorhythm theory is easily discredited. Legitimate biology doesn't support invariable performance cycles yoked to birthdays, and biorhythm theory fails to predict performance systematically. Skeptical Inquirer alone published five biorhythm-busting articles, in addition to the one authored by Bainbridge (Fall/Winter 1976; Fall 1978; Summer 1979; Summer 1990; Fall 1990).

Second, biorhythm theory struggles to elude unsupportive results because it consistently makes similar predictions about up days, down days, and critical days. By contrast, astrology models have all sorts of permutations that believers can use to cover failed predictions.

Third, the supposed benefits provided by biorhythm-based insights are tepid when compared to the benefits offered by other forms of well-being pseudoscience. Thommen's biorhythm-promoting book can only ask *Is This Your Day?* In one version of the book, the cover links biorhythms to "a fuller and safer life." Forget feeling great and looking hot. Safety's calling.

Fourth, biorhythms eventually went out of style. Biorhythm's pseudoscientific apex might have been its association with the Mattel Aquarius home computing system in 1983. Yep. Whoever bought the Mattel Aquarius could pop in a *Biorhythms* cartridge to gather erroneous information about expected levels of performance.

Gaming kids from the late 1970s know that Atari 2600 was, as they said, on like Donkey Kong! An Atari 2600 biorhythm cartridge would have placed it between long-standing classics such as *Frogger*, *Adventure*, and *Pac-Man*. Instead, biorhythms' peak placed it in a less-popular system whose games included *Phrogger*, *Disco Fever*, and *Mower Man*.

Today, astrology still sounds kind of chic in a mystical science-ignorant kind of way. Biorhythm theory sounds like something your Uncle Eugene used to set the date for his keyboard recital.

Post-Warp Summary

We can understand skeptics feeling down about the continued proliferation of claptrap. The biorhythm story should provide some encouragement to our critical-thinking community.

Skeptical Inquirer surely played a big role in turning biorhythms from cutting-edge pseudoscience to yesterday's news by publishing thoughtful articles about biorhythms' deep problems. The authors of those articles—A. James Fix, Bainbridge, David Lester, Anthony Wheeler, Terence Hines, and Randi—deserve a mountain of credit.

But skepticism works importantly outside the articles and presentations that address unreasonable claims directly. Perhaps skepticism's greatest influence occurs through a national community that questions paranormal claims politely at the face-to-face level.

Six insightful authors are still just six people. It is the groundswell of belief, or disbelief, that really makes paranormal claims fall out of favor. ■

[SKEPTICAL INQUIREE BENJAMIN RADFORD

Benjamin Radford is a research fellow at the Committee for Skeptical Inquiry and author or coauthor of fourteen books, including *America the Fearful: Media and the Marketing of National Panics*.

Investigating the Silent Chamber of Insanity

Q: **Have you heard about the room that's so quiet that anyone who stays long either dies or goes insane? What's the truth behind that?**

—Mindy H.

A: Stories surrounding silent chambers sound like something from the fevered prose of H.P. Lovecraft or Edgar Allan Poe—perhaps echoes of *The Telltale Heart*. One popular meme—prefaced by the word *FACT* in all caps and shared by an Instagram account with the word *fact* in it, so you know it's true—states boldly: "The world's quietest room is at Orfield Labs in Minneapolis. The chamber is so quiet, you can hear your own organs; after thirty minutes, you'll begin to hallucinate. The longest anyone has lasted inside is forty-five minutes."

FACT
@factt5
The world's quietest room is at Orfield Labs in Minneapolis. The chamber is so quiet, you can hear your own organs; after 30 minutes, you'll begin to hallucinate. The longest anyone has lasted inside is 45 minutes.
Goodwill Librarian
4 hours ago
Brings new meaning to, "Finding a quiet place to read."

No less a reputable news outlet than *The Daily Mirror* offers another scary take on a similar place:

> With a measured background noise that is 20 decibels below the threshold of human hearing, the room in Building 87 at Microsoft's headquarters in Redmond, Washington makes you eventually lose your balance. No one can stay inside for more than an hour … . But if you do manage to stay long enough, it is reported that you will be able to hear your heartbeat and a ringing will echo in your ears, becoming deafening. When you move, your bones make a grinding noise. And eventually you will lose your balance, because the absolute lack of reverberation sabotages your spatial awareness. (Cosic 2023)

These descriptions raise a host of questions: Why is hearing your own organs relevant? Are audible breathing or borborygmi inherently dangerous? If you're hearing yourself breathe and move, then the room isn't actually quiet, is it? Why would sustained silence, specifically, elicit hallucinations? Is the deaf community somehow at elevated risk for this harm? Why would forty-five (or sixty) minutes be the human endurance limit? If the experience really becomes unbearable, couldn't you just crack your knuckles, say a word, or clear your throat to successfully stave off impending insanity? And, of course, what sort of sick, sadis-

tic fiend would create a room suffused with such insufferable silence? Was *Saw*'s John Kramer the architect?

Though there's some pedantic dispute as to which is the ultimate quietest chamber, the principles are the same. Soundproofing rooms is not complicated (the science of acoustics is well understood), but it can be expensive. Amateur podcasters can fake it pretty well (I recorded the audiobook version of *Investigating Ghosts: The Scientific Search for Spirits* in a closet under a frame with heavy fabric draped over it), but professional recording studios are needed for music. I've been in sound-reducing containers in science museums, and they're remarkably effective, using wedge-shaped foam to absorb rather than reflect sound waves.

There are scientific purposes for such chambers, and there's nothing inherently sinister or secret about them; in fact, tours can be arranged. In part due to their unusual nature, social media has helped to spread myths and rumors about the chambers. For a while, as part of the perennially popular "challenge" fad on social media—ranging from dumping ice buckets to eating super-hot foods to more sinister ones such as the Blue Whale Game (see Radford 2017)—there were unfounded claims that anyone who survived a few hours in the anechoic chamber of horrors would get a million dollars.

Silence & Sanity, Physics & Psychology

The lack of sound is of course an anomaly; we are born into a world of audio contaminated by conversations, device alerts, animals, engines, and so on. For many people, ambient sounds can be soothing; city dwellers easily fall asleep to a background din of traffic, machinery, and cursing that might annoy others, while rural folks might think nothing of cicadas, birds, and roosters as slumber background. More recently, social media has popularized a phenomenon called autonomous sensory meridian response (ASMR), often through auditory cues, said to induce in some people a soothing tingling sensation. Millions of people seek out soothing and repetitive ASMR sounds, including the turning pages of a book, rainfall, paper being crumpled, and so on.

It is true that sensory deprivation can cause perceptual distortions; this is a well-understood phenomenon popularized and dramatized by the 1980 William Hurt film *Altered States*. Experiments using Ganzfeld (exposure to an unstructured, uniform stimulation field) have demonstrated that mild pseudo-hallucination effects can be created in many people (see, for example, Wackermann et al. 2008). People trapped in caves and mines for extended periods often report hallucinations. Even prolonged stress and loneliness can trigger hallucinations under some conditions; in his book *Lost in the Jungle*, Yossi Ghinsberg describes conversations with imaginary companions he experienced while lost in the Peruvian Amazon for weeks.

However, outside these extremes, for many people the chance to be in a perfectly quiet room would be a blessing, not a curse. Given a suitably comfortable position—which you'd want if you're sitting anywhere for more than a few minutes—many people would fall asleep. Any existential, horrifying silence would give way to boredom and slumber, not insanity and death. It's quite likely that people would wake up a few hours later, having surpassed the supposedly scientifically verified upper limit of human silence endurance without even knowing about it, deep in the Land of Nod.

So, what's the terrifying truth? As it happens, a journalist named Caity Weaver, writing for the *New York Times Magazine* (Weaver 2022), bravely risked her sanity to experience it for herself. She visited Orfield Laboratories, the place mentioned in the meme, and bravely subjected herself to some silence. She described some interesting and unique experiences, for example writing that

> I had been warned that anyone speaking to me inside an anechoic chamber would sound as if they were standing just next to me, murmuring into my ear. It's an aural illusion: In a normal room, the only way for us to hear speech directly from someone's mouth, with no reverberation, is for him or her to talk right into our ear.

(You don't need to visit a chamber to encounter similar perceptual shifts; scuba divers experience color and sound differently underwater due to light and sound waves being carried through water rather than air.)

The lights were turned off, leaving her in both silence *and* darkness. She lasted three hours. As to the terrifying experiences, she mostly reported … boredom. Weaver ends on a tone that is both media savvy and suitably skeptical:

> How many things do we misinterpret as out of the ordinary because we are told online that they are? The sole hallucination I had experienced on my journey to the rumored brink of insanity was one manufactured in the brains of other people: a collective fantasy that a room could be made hazardously quiet.

That is precisely the same process, psychological priming, that leads people to interpret otherwise mundane phenomenon as strange, unusual, or mysterious. If you're told that a house (or lake) is haunted by a ghost (or monster), then the chances of you experiencing something that confirms your belief increase dramatically. And in a twist that Poe knew well, if you believe that a given usual place—say, a very quiet room—will lead to hallucinations and strange experiences, well, it just might. ■

References

Cosic, Milica. 2023. Inside the quietest room in the world - and no one can stay inside for more than an hour. *The Daily Mirror.* February 3. Online at https://www.mirror.co.uk/news/weird-news/inside-quietest-room-world-no-29124925.

Radford, Benjamin. 2017. Moral Panic Du Jour: The Blue Whale Game. June 15. Skeptical Inquirer. Online at https://skepticalinquirer.org/exclusive/blue-whale-game/.

Wackermann, Jiří, Peter Pütz, and Carsten Allefeld. 2008. Ganzfeld-induced hallucinatory experience, its phenomenology and cerebral electrophysiology. *Cortex.* 44(10). Online at https://doi.org/10.1016/j.cortex.2007.05.003.

Weaver, Caity. 2022. Could I Survive the 'Quietest Place on Earth'? *The New York Times Magazine.* November 23. Online at https://www.nytimes.com/2022/11/23/magazine/quiet-chamber-minneapolis.html.

a legacy that stands

The Test of Time

Even though astronauts last took steps on the moon in 1972, the imprint from each of their steps remains today. What a tremendous legacy! Those footprints will stand as a reminder of an accomplishment for generations to come.

What would you do if you had the power to do something remarkable today while making an impact that would last forever, the kind of impact that takes little time and costs you nothing? All of this is possible when you take a moment to review and update the beneficiary designations for your retirement and bank accounts.

If you have any of the following, then you have a great opportunity to leave your own lasting impact:

- IRA, 401(k), or 403(b) retirement accounts
- Investment accounts
- Checking, savings or CD account
- Life insurance you no longer need

The process of naming beneficiaries is easy. It gives you the power and control to tell your administrator who will inherit your accounts when you pass away. With a beneficiary designation, you still own the account and can continue to use it to meet your needs.

To name your beneficiaries, ask your account custodian, insurance agent, or bank to send you a beneficiary designation form, fill it out, and return it. You can name family, friends, or an organization like ours to inherit your account. When you leave a gift to us, we will be able to continue our work.

CONTACT US TODAY!

Debbie Allen
Director of Development
dallen@centerforinquiry.org
(716) 300-8311
cfilegacy.org

Copyright © 2019 Crescendo Interactive, Inc. Used by permission. 19TH11

Is Bigfoot Dead?

BENJAMIN RADFORD

Twenty years ago, in this magazine I wrote an overview of the evidence for Bigfoot. Titled "Bigfoot at 50: A Half-Century of Bigfoot Evidence," it was meant to give skeptics and layfolk alike a concise overview of the variety and quality of evidence proffered to date for the existence of the elusive bipedal creature said to roam North America.

The birth of Bigfoot (as a phenomenon, if not as a corporal creature) is complex and closely linked with its Canadian cousin Sasquatch (see, for example, Loxton and Prothero 2013 and Regal 2011). How long Bigfoot has been around is of course unknowable; the fifty years mentioned in the original piece was a rough estimate including a seminal December 1959 *True* magazine article describing the discovery of large, mysterious footprints the year before in Bluff Creek, California. They turned out to have been the work of Ray Wallace, who is acknowledged to have made countless hoaxed tracks, using various carved wooden feet, throughout the 1950s and 1960s. Though there were others at the time, the Bluff Creek tracks were not only demonstrably faked (his relatives revealed the hoax upon his death, including some of the "big feet" used) but widely regarded as evidence both key and credible. Here I've adopted a longer view of the phenomenon, reaching back some sixty-five years since infamous tracks propelled Bigfoot into the public's consciousness; it would be another nine years before the one-minute film shot by Roger Patterson and Bob Gimlin cemented the creature's international fame in celluloid.

As we approach a quarter-century into the new millennium, Bigfoot is nowhere to be seen. While Nessie searches and chupacabra reports still make the news with some regularity, Bigfoot—once ubiquitous, from monster trucks to pizzas, beef jerky to the *Six Million Dollar Man*—has been relegated to a handful of cryptid conferences and the occasional fruitless "reality" television search. In fact, Bigfoot hasn't even appeared on the cover of this magazine for well over a decade (that's me in a Bigfoot costume on the March/April 2002 cover).

The goal of this article is to update readers on the status of the evidence for Bigfoot. There are of course no huge surprises at the end; if definitive, scientific evidence had been found, you'd have read about it in peer-reviewed journals and storied newspapers such as *The Washington Post* and *The New York Times*. Nevertheless, there is much we can learn—about pseudoscience, popular culture, and fringe beliefs among other things—from a close examination of the search for Bigfoot.

In the past two decades, much has changed in the world, though the search for the mysterious monster has largely stalled, despite periodic premature pronouncements of Bigfoot breakthroughs and Sasquatch surprises. There has also been some effort within the community to rebrand Bigfoot as

Medical Prayer Studies • Undercover Among the Spirits • Science and Religion Conference
Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON
Volume 26, No. 2 • March/April 2002
• Evaluating 50 Years of Bigfoot Evidence
• Cripplefoot Bigfoot Hobbled
Bigfoot
Pseudohistory in Roman Coins
Are Science and Religion Compatible?
The Emptiness of Holism
SPECIAL REPORTS
The Mothman Mystery
Bioterrorism and Alternative Medicine
Published by the Committee for the Scientific Investigation of Claims of the Paranormal

Sasquatch, much in the way that the term *UFO* has partially been replaced by *UAP* in that community. New animals have been discovered over the past decades—no entirely unknown animals such as Bigfoot, but mostly newly identified or rediscovered subspecies of birds, insects, amphibians, mammals, and the like. It's undeniably true, as Bigfoot buffs like to remind us, that science doesn't know everything about the world and that amazing discoveries are yet to be made, certainly even zoological ones. Whether an extant population of tens of thousands of giant hairy monsters are hidden across North America is, of course, a very different question.

It's easy for the casual observer or skeptic to miss the (Bigfoot-free) forest for the trees, so the accompanying timeline offers a concise overview of the significant developments in the search for Bigfoot this millennium.

Still Squatchin'

Bigfoot is still sought, the pursuit kept alive by a steady stream of ambiguous sightings, occasional photos, footprint finds, and sporadic media coverage. But what evidence has been gath-

TIMELINE: Bigfoot's Demise in the Twenty-First Century

2000: A team of prominent Bigfoot investigators from the Bigfoot Field Research Organization (BFRO), including Grover Krantz, Jeff Meldrum, Matt Moneymaker, and John Green, led an expedition near Mt. Adams in Washington state. They found what they claim to be a large mammal's left forearm, hip, thigh, and heel imprint in a muddy wallow. All agreed that the cast could not be attributed to any commonly known animal of the area and "may represent an unknown primate." The impression was found near a bait area where apples, melons, and peanuts had been laid out, yet somehow the researchers failed to record what animal had taken their bait. A cast was taken from the impression (dubbed the "Skookum cast" or "Bigfoot's Butt Print"), which measured 3.5 by 5 feet and weighed 200 lbs. This made quite a stir in the Bigfoot community, as it was the first "body print" found, and—if authentic—was arguably the most significant evidence since the 1967 Patterson/Gimlin film. I first took special notice of the imprint when I was interviewed about it for an article in *New Scientist* magazine, and I asked Moneymaker for permission to examine the cast; he refused.

2002: Decades of Bigfoot hoaxing is revealed when former logger and lifelong prankster Ray Wallace dies. Once a worker at a logging camp in Humboldt County, California, in 1958 he carved wooden shoes that resembled oversize human tracks, which he used on and off for decades in mountain areas for unsuspecting loggers and hikers to marvel and puzzle over. Wallace's family had proof, producing the carvings that were later revealed to match at least one famous set of prints, the Onion Mountain/Blue Creek Mountain tracks found in 1967. Wallace's faked tracks spawned seminal media coverage of Bigfoot, including in the *Humboldt Times* (Eureka, California), which first coined the word term *Bigfoot* in 1958. Bigfoot experts grudgingly acknowledged the prolific hoaxing but stated that, of course, Wallace hadn't made all the tracks.

2004: Greg Long publishes *The Making of Bigfoot*, the most in-depth examination of the famous and hotly disputed 1967 Patterson/Gimlin film. Coauthored with Kal K. Korff, the book offers a plethora of original research to paint a damning portrait of Roger Patterson's trail of debts, fraud, and dishonesty. While not definitively solving the mystery, the research raises red flags about the circumstances behind the film.

2005: Bigfoot researcher Tom Biscardi appears on the popular radio show *Coast to Coast with George Noory* claiming that his group had captured a male Bigfoot weighing over 400 pounds and standing eight feet tall. Audiences who would like to learn more were invited to watch his pay-per-view cable TV show for only $59.95. It was a hoax.

2005: A video ostensibly of a Bigfoot, dubbed the "Sonoma video," circulates widely. It depicts a dark figure in a grassy area. Some prominent cryptozoologists, including Loren Coleman, Steve Kulls, and John Freitas, are skeptical. Others, including Moneymaker of the BFRO, heartily endorse it as authentic; the website stated that they "are confident the Sonoma footage is not fake (i.e. not animation or a man in a costume). This figure is most likely a real sasquatch—a survivor of the gigantopithecus [*sic*] line of apes. … This looks like a real sasquatch. We don't think the figure in the Sonoma footage is a man in a costume. We would not be able to duplicate the anatomy of this figure, and we doubt anyone else can either" (quoted in Woolheater 2006).

2006: On their television show *Bullshit!* (season four, episode four), magicians Penn and Teller reveal that they were behind the hoaxed Sonoma Bigfoot footage authenticated by the BFRO. So certain that he could not be fooled, then—because there was a delay between the hoax being revealed and the episode airing—Moneymaker issued a statement declaring that Penn and Teller were lying for publicity and reiterating his conviction that the footage was indeed authentic.

2006: Paleontologist Anton Wroblewski identifies the Skookum Cast as having been made by a cervid, likely an elk. The BFRO could not explain why some of the world's most prominent scientific Bigfoot researchers had failed to

recognize an elk wallow—especially because elk tracks were correctly recognized and identified all around the track itself (see Perez 2007).

2006: Textures in plaster casts of alleged Bigfoot tracks said to reveal fingerprints—claimed as strong evidence for authenticity by prominent Bigfoot expert Jimmy Chilcutt, among others, because a hoaxer would not likely think to create them—are revealed to be artifacts of the drying process; in other words, identical "fingerprints" appear in casts of inanimate objects; for more, see Dennett 2006.

2007: *MonsterQuest*, a cryptozoology-themed reality TV show, premieres on the History Channel network. The show ended after four seasons, having covered Bigfoot (or some version thereof) in at least a dozen episodes, popularizing and legitimizing the "scientific" search for Sasquatch. However, the show never provided credible evidence.

2008: Matthew Whitton and Rick Dyer claim to have found a dead Bigfoot in the northern woods of Georgia. They provided photos claimed to be of the body in a freezer and said they would reveal more at a press conference in Palo Alto, California. The team included Tom Biscardi, who promised that "Extensive scientific studies will be done on the body by a team of scientists including a molecular biologist, an anthropologist, a paleontologist and other scientists over the next few months at an undisclosed location" under armed guard. It was a hoax (for details, see Kulls 2012 and Radford 2008).

2011: *Finding Bigfoot*, a reality TV show, premieres on The Animal Planet network. The hit show featured a small cast of researchers including Moneymaker (founder and president of the BFRO) and James Fay, a.k.a. Bobo, a burly backwoodsman. Patterned after shows such as *Ghost Hunters* and *MonsterQuest*, the team would interview eyewitnesses, review evidence, and attempt to collect photographic, audio, or forensic evidence, often during stakeouts and using infrared cameras. The show's run ended in 2018, never having achieved the title's promise.

2012: Two vehicles in rural Montana hit and kill what was apparently a Bigfoot on U.S. Highway 93 south of Kalispell late at night. It turned out to be Randy Lee Tenley, a local man trying to hoax a Bigfoot sighting; after interviewing Tenley's friends, police said that he "was trying to make people think he was Sasquatch so people would call in a Sasquatch sighting."

2012: Melba Ketchum, a Texas veterinarian and Bigfoot researcher, announces the results of a five-year investigation: her "team of scientists … confirms the existence of a novel hominin hybrid species, commonly called Bigfoot or Sasquatch, living in North America" and that Bigfoot is a human relative that arose some 15,000 years ago. When her badly flawed research is rejected by peer-reviewed journals, she self-publishes it in a journal she created just for the purpose, *De Novo* (Radford 2012; Hill 2013).

2014: *$10 Million Bigfoot Bounty*, a reality TV show, premiers on the Spike network. Nine teams sought scientific proof of Bigfoot, with a $10 million reward if that evidence passed scientific muster. Hosted by Dean Cain and featuring skeptical, credentialed scientists and researchers Todd Disotell and Natalia Reagan, the show ended after one season without ever needing to pay out the bounty.

2023: Two years after being found guilty of professional misconduct, Melba Ketchum launches a crowdfunding effort, the Cryptid Genome Project, to raise "research funding for genetic research samples including Bigfoot, Dogman, giants, and others." She raised nearly $25,000 from donors, promising that they would "be kept abreast of progress with a signed NDA [non-disclosure agreement]." To date, no credible evidence has been reported.

2023: Peter Byrne, the last of the so-called "Four Horsemen" of original Bigfoot research—the others being Rene Dahinden, John Green, and Grover Krantz—dies, sadly never having seen good evidence of the existence of his quarry.

Frame 352 from the Patterson Gimlin Bigfoot film

ered over the past sixty-five years? And what conclusions can we draw from that (lack of) evidence? Bigfoot evidence can be broken down into a few general types: eyewitness sightings, footprints or other tracks, recordings (photographs, videos, and vocalizations, for example), and somatic samples (hair, blood, etc.). There are other claimed physical traces such as twisted tree branches, and some researchers try to recast folklore and indigenous legends as historical eyewitness accounts.

Eyewitness accounts and anecdotes still comprise the bulk of Bigfoot evidence. Due to the well-known and inherent fallibility of eyewitnesses—especially under the poor conditions many sightings occur (at night or dusk, at great distance, etc.)—they are of very little evidentiary value. Bigfoot tracks are the most recognizable evidence, but they are of similarly limited value. Like photographs, film, and video, tracks by themselves may be useful if they lead to further, forensic evidence (which they rarely if ever do). Contrary to many Bigfoot enthusiasts' claims, Bigfoot tracks are not particularly consistent and show a wide range of variation (Dennett 1994).

Where's the Bigfoot Beef?

The most famous recording of an alleged Bigfoot was a 16mm film taken in 1967 by Roger Patterson and Bob Gimlin. Shot in Bluff Creek, California, it allegedly shows a Bigfoot striding through a clearing. In many ways, the veracity of the film is crucial because the casts made from those tracks are as close to a gold standard as one finds in cryptozoology. Many in the Bigfoot community are adamant that the film is not—and more importantly *cannot be*—a hoax. Despite ample circumstantial evidence of fraud (Long 2004), whether the film is provably a hoax or not is still an open question, but the claim that the film *could not have been faked* is demonstrably false. It is of human size and anatomy (allowing for a costume), and its gait can be easily duplicated by humans (see Daegling and Schmitt 1999).

The alleged failure of the film to be recreated by skeptical researchers has long been a popular talking point among Bigfoot believers, claimed as strong evidence that it is authentic. After all, they say, "If it's faked, why can't anyone re-create the film using materials available in 1967?" I investigated and debunked this claim a few years ago; Bigfoot proponents were unable to

identify a single attempt at recreating the Patterson/Gimlin film using period equipment, the correct location, a credible costume, and other important criteria (see Radford 2022). It's not that no one *could* do it; instead, understandably, no one has bothered investing the time, expense, and effort into a replication project that has no chance of definitively settling the matter.

More importantly, the Bigfoot community has the logic exactly backward: the question is not why no one has replicated the film if it's a hoax, but instead why no one has replicated the film if it's real. In other words (regardless of the film's authenticity), why does the best Bigfoot footage date back to the Lyndon Johnson administration and the release of *Sgt. Pepper's Lonely Hearts Club Band*?

Bigfoot believers must reckon with a drought of evidence caused by modern technology. Decades ago, the best evidence for marquee monsters were low quality photos. The most famous image of the Loch Ness monster—poor quality though it was—was revealed as a hoax. The most famous image of the Champ Lake monster was almost certainly a misidentified log, as Joe Nickell and I discovered during field experiments at the lake (Radford 2003). And so on.

This poses a serious blow to the film's credibility: If these Bigfoot creatures are really out there wandering in front of eyewitnesses with cameras, why haven't better films and videos emerged in the past fifty-seven years? Both still and video cameras have become much higher quality and much cheaper over the past decades. It used to be that quality cameras were needed to take high-quality photographs; anyone could take a blurry Disneyland vacation photo with a pocket camera, but to get clear, sharp shots you often needed a more expensive camera and lens. Then came fully automated, point-and-shoot cameras in the 1980s. Amateur photos suddenly looked much better as technology allowed the camera itself to adjust the focal length, shutter speed, and so on. Even the most incompetent photographer could snap decent photos.

These days most people have a twelve-megapixel, high-definition camera in their pocket smartphones, which provide stabilizing, zoom, and other features that would have been the envy of Hollywood only a decade ago. At no time in history have so many people had high-quality cameras on them virtually all the time. If Bigfoot, Nessie, and the chupacabra exist, logically the photographic evidence for them should improve significantly over the years. Yet it hasn't. Photographs of people, cars, mountains, flowers, sunsets, deer, and literally everything else in the world have gotten sharper and clearer over the years. The only exceptions are things never proven real, such as Bigfoot, ghosts, and UFOs.

Blaming the Skeptics

Who's to blame for this dismal dearth of credible evidence? Skeptics, of course. The proliferation of Bigfoot reality shows robs Bigfoot believers of a favorite standard rebuttal: that fear of ridicule has deterred many people from not only looking for Bigfoot but also competently investigating it. Veteran cryptozoologist Loren Coleman and others have joined the chorus of complainers that a conspiracy-esque "wall of skeptical ridicule" silences witnesses; Joshua Blu Buhs, in his book *Bigfoot: The Life and Times of a Legend*, even suggests without evidence that ridicule is "the skeptics' primary weapon."

Alleged Bigfoot print found outside of Buffalo, New York, in 2006. Photo by the author.

The idea that mean, old skeptics are working furiously to keep the public from believing in Bigfoot has been an article of faith in that community for decades. Not only have they failed to offer evidence, but they ignore obvious and plentiful counterevidence: Many Bigfoot "experts" are treated as celebrities, not outcasts. They make appearances at Bigfoot and paranormal conferences. They sign autographs, give talks about their experiences, and sell books. They also appear on television shows and series—a powerful incentive for people to come forward with their stories and evidence.

Of course, as with any fringe belief, some people may experience social pressure to keep silent about their sightings or assumptions about Bigfoot. Sure, if you mention to your boss or client that you saw Bigfoot, they may look at you funny—but that's not the fault of the Committee for Skeptical Inquiry (CSI) or skeptics generally. There is no sustained, organized attempt by any skeptics or organization I'm aware of to shame, mock, or silence believers in Bigfoot, ghosts, or any other fringe belief. I am one of the most prominent Bigfoot skeptics in the world, and I have consistently avoided (and actively discouraged) ridicule of any eyewitness. My approach is staunchly sympathetic, informed by psychology and folklore. While some skeptics, somewhere, at some time, may have gone out of their way to mock Bigfoot believers and eyewitnesses, that is not my approach, nor that of anyone I know or respect.

Furthermore, people routinely and proudly show and share their lack of skepticism on social media. Since when are Americans reluctant to endorse bogus claims or fringe belief (about Bigfoot, UFOs, conspiracies, politics, or anything else) on social media? Would that skeptics wielded a fraction of the influence their critics fear!

In 2023, Matt Moneymaker, head of the largest organiza-

tion researching Bigfoot, posted a long piece promoting his upcoming appearance at a Bigfoot conference while complaining that CSI, copublisher of this magazine, has engaged in a decades-long effort to thwart Bigfoot research. Yes, that's right: The failure of his group, the Bigfoot Field Researchers Organization, to find good evidence of Bigfoot over the past three decades or so is due in large part to the powerful stranglehold that the Committee for Skeptical Inquiry has on scientific research. In much the same way that UFO buffs blame their lack of evidence on government conspiracies and coverups, Moneymaker blames shadowy skeptics. He writes, in part:

> The traditional barrier to academic inquiry … comes mainly from an organization formerly called CSICOP. Nowadays they have renamed themselves The Committee for Skeptical Inquiry (CSI). There is definitely a need for an organization focused on rooting out science-related false claims. … However, this type of organization becomes a BAD thing for society when it morphs into a policing organization for academic research. CISCOP [*sic*] now exerts enormous influence in places like Wikipedia and the National Science Foundation. It is one thing to alert a gullible community to the tricks of a false demigod. It is another thing to deter scientists from looking at evidence of a nature mystery. CISCOP [*sic*] and their followers strenuously exert cancel-culture-style influence in academia to deter academic/scientific inquiry in certain fields … they smear as "pseudoscience" … such as parapsychology and Bigfoot research. … One example: CSICOP was able to add their own language to policy documents of the National Science Foundation (NSF). The NSF makes grants for scientific research. The policy language added states that mere mention of the word "Bigfoot" or "Sasquatch" is "a marker for scientific illiteracy." That insertion effectively put the kabosh [*sic*] on any academic inquiry into the Bigfoot subject for many years. There are several other examples of CISCOP [*sic*] interfering with gov policies about science funding. If they cannot succeed by direct manipulation then they will try to control how an organization or effort is perceived by the general public, by editing the Wikipedia page. (Moneymaker 2023a)

Moneymaker then announced a Bigfoot DNA project that will go on

> with preparedness for dealing with CISCOP [*sic*] interference. What motive would CISCOP [*sic*] have for detering [*sic*] scientific inquiry into a legitimate scientific question?? Answer: If the Bigfoot DNA study yields results it could unravel the power and shadowy cancel-culture-Ish influence of their organization, especially their controlling presence in Wikipedia. … Not only was CISCOP [*sic*] wrong about the bigfoot subject, but their efforts over the years to dissuade academic inquiry into the subject was nothing short of scandalous.

There's a lot to unpack here but suffice it to note that there are several demonstrable errors of fact and opinion, including that CSI "has a controlling presence" on Wikipedia. Skeptic Susan Gerbic has for years led an all-volunteer effort to improve the quality of Wikipedia information on paranormal topics specifically, but she works independently. Gerbic is not an employee of CSI, nor is anyone on her team; furthermore, literally anyone can edit Wikipedia as long as they follow the rules for quality references and citations. CSI hardly controls the site's content.

Complaints about skeptics' "cancel-culture-style influence in academia" are similarly specious. I was unfamiliar with Moneymaker's claims about the NSF and sought the institutional knowledge of Barry Karr, CSI's longtime executive director. He explained that the only thing he could think of was that "Some years ago—back in 1999—we were approached by Melissa Pollack of NSF to contribute to the updating of the public attitudes toward science survey they did every other year. So we recommended some people to read over the survey and make recommendations" (Karr 2023). This had nothing whatsoever to do with "government policies about science funding" but was instead requested input on a questionnaire. CSI is not aware of any attempted or realized effort to restrict or deny funding into Bigfoot research, through the NSF or any other organization. Nor is CSI aware of any grants that were denied on that basis.[1]

I am not even remotely concerned that any results from any Bigfoot DNA study "will unravel the power and shadowy cancel-culture-ish influence" of our organization, and Moneymaker's larger point has it once again exactly backward. In 2019, I was asked to research a Bigfoot sighting supposedly investigated by the Bigfoot Field Research Organization (BFRO). The full details of the case can be found in these pages, but my conclusion was that:

> Quite the opposite of Moneymaker's claim, my criticism of his organization was based on the fact that they had failed to adequately investigate a potentially important "Class A" report. If this story is true as told, it could potentially be one of the most significant Bigfoot reports in modern American history. Given the duration, nearness, and multiple witnesses, others there that day might have gotten close-up photos or even video of the mysterious creature. … Yet BFRO seem curiously uninterested in pursuing the story. I could do it, but the burden of proof is of course on the claimant. … I have neither the time nor interest to spend unpaid days or weeks investigating the sensational claims they promote. … This case neatly illustrates the differences in approach (and what constitutes evidence) between Bigfoot believers and cryptozoology skeptics. To the BFRO, interviewing an eyewitness is the final step of an investigation; to a skeptic it's only the beginning. Whether out of incompetence, indolence, ignorance of proper investigation procedures—or a tacit reluctance to dig too deeply into an inherently dubious claim—researchers of the "unexplained" (and Bigfoot researchers in particular) often offer merely the pretense of investigation. (Radford 2019)

This skeptical organization's chief complaint is not that researchers are taking Bigfoot too seriously; it's precisely the opposite: *that they're not taking it seriously enough.* They're not doing the quality scientific research that could prove the existence of these creatures. Moneymaker and much of his ilk are doing shoddy research, chronically unable or unwilling to shun hoaxers, establish investigative rigor, and adhere to scientific methods (for more, see Radford 2019).

Reputable scientists, including Todd Disotell, Darren Naish, Natalia Reagan, Jeff Meldrum, Michael Forstner, Henner Fahrenbach, Brian Sykes, and others, have indeed investigated evidence for Bigfoot and other mysterious creatures—a fact that Moneymaker conveniently ignores. In some cases, the research has been published in respected, peer-reviewed journals (see, for example, Sykes et al. 2014); beyond that, it's not clear what, exactly, Moneymaker thinks prominent working scientists could do with eyewitness reports, blurry photos, and the like. Besides, the Bigfoot community has several prominent people with academic pedigrees, including Melba Ketchum, a Texas veterinarian who falsely claimed to have discovered Bigfoot DNA (see timeline) and was found to have engaged in professional misconduct related to her forensic analysis in a criminal trial, including that "she was aware of and consciously disregarded an accepted standard of practice." For a good analysis of sensational claims about possible Bigfoot evidence in environmental DNA, see Naish 2021.

Matthew Johnson is another Bigfoot investigator quick to highlight his PhD—in psychology. He's been at it for over twenty years, and according to Johnson's website:

> The second decade of research and trying to find Bigfoot yielded unbelievable results. … [Johnson] learned that the North American Indians were correct and that the Bigfoot species were a Forest People with paranormal abilities. The Bigfoot Forest People are able to cloak, read through memories, engage in Mind Speak (i.e., Telepathic Communication), immobilize and heal people, shape-shift, transform from flesh and blood into orb form and vice versa, and so much more.

With all due respect to Moneymaker, Ketchum, and Johnson, I can see why respected scientists might not be eager to share a stage with this caliber of experts. For an in-depth look at the role of anthropologists and other scientists in the search for Bigfoot, see Brian Regal's *Searching for Sasquatch: Crackpots, Eggheads, and Cryptozoology* (2011).

The Future for Bigfoot

Bigfoot researchers admit that most sightings are misidentifications of normal animals, while others are downright hoaxes. The remaining sightings—that small portion of reports that can't be explained away—intrigue researchers and keep the pursuit active. The issue is then essentially turned into the claim that "Where there's smoke, there's fire." Yet the evidence suggests that there are enough sources of error (bad data, flawed methodological assumptions, mistaken identifications, poor recall, hoaxing, etc.) that there does not have to be—nor is there likely to be—a hidden creature lurking amid the unsubstantiated and ambiguous cases.

Bigfoot display at Museum of the Weird, Austin, Texas. Photo by the author.

Ultimately, the biggest problem with the argument for the existence of Bigfoot is that no bones or bodies have been discovered. Believers offer an array of special pleading arguments, speculating for example that Bigfoot bury their dead or have bones that decompose with surprising speed, but in the end, there is no logical reason at least one of the millions of Bigfoot bones that must litter the forests and meadows cannot be found.

If the Bigfoot creatures across the United States are really out there, then each passing day should be one day closer to their discovery. The story we're being asked to believe is that thousands of giant, hairy, mysterious creatures are constantly eluding capture and discovery and have for a century or more. At some point, a Bigfoot's luck must run out: one out of the thousands must wander onto a freeway and get killed by a car, get shot by a hunter, or die of natural causes and be discovered by a hiker. Each passing day, month, year, and decade that go by without definite proof of the existence of Bigfoot make its existence less and less likely. This is especially true today, when wild animal habitats are inexorably being encroached on by mankind. Forests are disappearing due to development, wildfires, and other factors, leaving less space for the giant

animals to hide. Climate change is playing a role as well, with animals being forced from their native habitats to go farther for prey, water, and shelter.

If Bigfoot is a self-perpetuating phenomenon with no genuine creature at its core, the stories, sightings, and legends will continue. It is ironic that, if Bigfoot is dead, we may never know it. The notable lack of good evidence hasn't dampened the enthusiasm of devotees; they have all they need in sighting reports, fuzzy photos, inconclusive hair samples, and footprints to keep the search going. If Bigfoot hasn't been found, it's not for lack of funding or resources (several searches for Bigfoot have been well-financed, and anyway searching for Bigfoot requires nothing more than hiking boots and free time). If they are real and exist in areas accessible to humans—which, if the eyewitness sightings are credible, they by definition do—then anyone could potentially find one at any time. Nor is it for lack of effort (thousands of both amateur and "professional" Bigfoot hunters have spent decades searching). Instead, the most likely reason for the failure is that the creatures simply do not exist and that the apparent evidence for them rests mostly on mistakes, hoaxes, and wishful thinking. ■

Acknowledgements

I am indebted to Matt Crowley for his helpful suggestions and feedback on the timeline and to the late Michael Dennett, who did pioneering skeptical research on Bigfoot evidence.

Note

1. When I contacted him for clarification or evidence, Moneymaker (2023b) attributed the assertion to a comment made to him by Darby Orcutt, a researcher and librarian. When I contacted Orcutt for clarification or evidence, he stated that his source was an NSF-issued statement he recalled reading about science illiteracy specifically, unrelated to funding. Orcutt was unable to provide a reference but said he would search for it, while acknowledging that he was not aware of any overt CSICOP attempts to influence funding policies. When informed of this, Moneymaker acknowledged that his claim about CSICOP was unverified and offered to remove that section from his website.

References

Daegling, David, and D. Schmitt. 1999. Bigfoot's screen test. Skeptical Inquirer (May/June).

Dennett, Michael. 1994. Bigfoot evidence: Are these tracks real? Skeptical Inquirer 18(5) (Fall).

———. 2006. Experiments cast doubt on Bigfoot 'evidence.' *Skeptical Briefs* (September 1).

Hill, Sharon. 2013. Bigfoot DNA study: Making an end run around science. Skeptical Inquirer (May/June).

Karr, Barry. 2023. Personal communication (August 24).

Kulls, Steve. 2012. *Fifty Large: The Real Story of the Georgia Body Hoax.* CreateSpace.

Long, Greg. 2004. *The Making of Bigfoot: The Inside Story.* Amherst, New York: Prometheus Books.

Loxton, Daniel, and Donald Prothero. 2013. *Abominable Science: Origins of the Yeti, Nessie, and other Famous Cryptids*. New York, NY: Columbia University Press.

Moneymaker, Matt. 2023a. Historic Milestone for Bigfoot Research: First Large Academic Study of Bigfoot / Sasquatch Evidence is Beginning only Now. Statement posted to Facebook page (July 9).

———. 2023b. Personal communication (September 21).

Naish, Darren. 2021. eDNA, footprints and the biological Bigfoot: Comments on an interview with Jeff Meldrum. *Tetrapod Zoology Blog* (April 23). Online at https://tetzoo.com/blog/2021/4/23/comments-on-an-interview-with-jeff-meldrum.

Perez, Daniel. 2007. Skookum hokum? *Bigfoot Times* (May). Online at http://www.bigfootencounters.com/articles/skookum_hokum.htm.

Radford, Benjamin. 2003. Chasing Champ: The measure of a monster. Skeptical Inquirer (July/August).

———. 2008. Georgia Bigfoot hoax draws global attention. Skeptical Inquirer (November/December).

———. 2012. Bigfoot DNA discovered? Not so fast. NBC News (February 14). Online at https://www.nbcnews.com/id/wbna50812504.

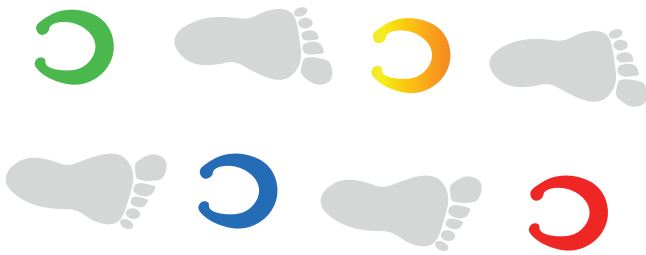
———. 2019. 'Class A' Bigfoot report reveals little about the beast—and much about the seekers. Skeptical Inquirer (January/February).

———. 2022. Duplicating Bigfoot duplicity. Skeptical Inquirer (May/June).

Regal, Brian. 2011. *Searching for Sasquatch: Crackpots, Eggheads, and Cryptozoology*. New York, NY: Palgrave Macmillan.

Sykes, Bryan, Rhettman Mullis, Christophe Hagenmuller, et al. 2014. Genetic analysis of hair samples attributed to Yeti, Bigfoot and other anomalous primates. *Proceedings. Biological sciences* 281(1789): 20140161. Online at https://doi.org/10.1098/rspb.2014.0161.

Woolheater, Craig. 2006. Sonoma shakedown, shakeup. Cryptomundo website (April 20).



Benjamin Radford is author of dozens of articles and several books about mysterious creatures, including *Tracking the Chupacabra: The Vampire Beast in Fact, Fiction, and Folklore* and (with Joe Nickell) *Lake Monster Mysteries: Investigating the World's Most Elusive Creatures*. His original research on Bigfoot, the Champ lake monster, Mothman, the Lizard Man, and others have appeared in Skeptical Inquirer for over twenty years. He is a folklorist and research fellow with the Committee for Skeptical Inquiry and cofounder of the *Squaring the Strange* podcast along with Celestia Ward, whose art appears in this issue.

Brain Training: Is There Evidence to Support the Claims?

M.J. SCHNEIDER AND INDRE V. VISKONTAS

The brain training industry is now well-established, and most people are familiar with claims that brain fitness is akin to physical fitness—do these exercises daily and your mind will sharpen up! But is there evidence that supports these claims? Can we distinguish apps that work from those that do not? What criteria should we consider when evaluating the effectiveness of a brain training tool?

Brain training apps, games, and programs are marketed as tools to improve cognitive abilities for many but also to stave off cognitive decline associated with age and even degenerative conditions such as Alzheimer's disease. These marketing claims assume that gains after training will transfer to cognitive function more generally. That is, training your mind on a game designed to help focus your attention will enable you to control your attentional focus in tasks outside of the game as well. This assumption is so pervasive that most people do not even consider whether skills trained using a given tool will transfer to real-world situations. But before we consider the evidence testing this assumption, it is helpful to distinguish tools designed to enhance function from those geared toward staving off decline.

Tools targeted at people who wish to improve existing abilities generally promise to improve cognitive functioning in school, work, or activities of daily living. In the education sector, some tools are marketed as fun games for kids, and promise a "leg-up" for school-readiness and future career success. Treatments marketed to working adults often highlight increased productivity and concentration as benefits of their programs. Some programs take a more wholistic approach to general brain health and market their product as a therapy to be used in conjunction with more traditional ways of maintaining health (i.e., balanced diet, exercise).

As mentioned earlier, brain training interventions may also be targeted at individuals wishing to prevent decline in cognitive functioning (e.g., memory) associated with age or degenerative conditions in which age is the greatest risk factor. These interventions target common fears people hold around aging—primarily that individuals will start forgetting things,

slow down, and lose mental clarity. But some go a step further, and even suggest that they can mitigate, prevent, or even reverse cognitive impairment that accompanies neurodegenerative disorders.

Many companies marketing these products make strong claims about research-driven interventions and high success rates. They might claim that working memory is vital for various cognitive functions such as focus, reasoning, learning, and resisting distractions and that their tools are scientifically proven to improve working memory and attentional focus. But do these results translate into better cognitive function in tasks of daily living?

Although many companies themselves are highly confident in their products, most researchers are not in agreement about the efficacy and translatability of brain training techniques. Over time, psychologists and neuroscientists have conducted empirical studies, reviews, and meta-analyses to evaluate the marketing claims and the efficacy of brain training. After all, the potential applications of brain training are compelling. If brief, game-like interventions designed to improve abilities and prevent decline can lead to desirable, real-world outcomes, then these training programs could be a shortcut to improving people's lives. Additionally, they would serve a growing need, as our population grows older, and more and more people show signs of age-related neurodegenerative diseases. This article will examine the mechanisms of brain training exercises, evaluate the evidence of efficacy for several popular brain training options, and suggest directions for future research.

What Is Brain Training?

Brain training (or "cognitive training" or "mind training") refers to activities and interventions targeted at making individuals "smarter" or preventing cognitive decline via training specific components of cognition (Katz et al. 2018). As mentioned earlier, the goals of most brain training interventions are either to enhance one's cognitive abilities, and/or stave off the cognitive decline associated with age or age-related diseases. A person's cognitive abilities can generally be defined as the skills required to perform tasks related to learning, memory, reasoning, language, understanding, and other abilities that are associated with how our minds function (APA Dictionary of Psychology n.d.).

Improving Abilities

We first examine brain training programs that aim to improve existing abilities. When one engages in brain training exercises, they are intended to improve different components of a person's cognitive abilities such as executive function, attention, and working memory. Executive function is an umbrella term that describes an individual's "higher level" cognitive abilities such as planning, problem solving, and decision making that require logical and abstract thinking (APA Dictionary of Psychology n.d.; Diamond 2012). Many brain training programs coach one aspect of executive functioning in an attempt to improve cognitive abilities more generally. For example, a participant might train their attention by practicing a series of attention tasks for several weeks, then to test improvement, complete a novel series of attention tasks. To test whether cognitive ability improves more generally, a participant may complete a battery of tests assessing working memory, attention, problem solving, and other executive function skills. This battery assesses whether training in one domain transfers to other domains of cognition and generates overall improvement.

Why do most interventions target these areas of cognition specifically? Katz et al. (2018) noted the reasons why brain training might target executive function, working memory, and attention. They suggest that these abilities are necessary for higher level, complex behaviors and they are strongly correlated with valued outcomes such as higher intelligence, academic success, and positive life outcomes. So naturally, if better attention, working memory, and executive abilities lead to a plethora of desirable traits and life outcomes, people want to boost performance in these areas. When interventions attempt to train these abilities, we are asking a fundamental question about the abilities themselves: are they changeable? Will our abilities, and subsequently our life outcomes improve as a result of input and training, or are they set in stone? In a sense, these interventions tap into our desire for the fountain of youth and our drive to continue to improve our minds.

Staving Off Cognitive Decline

Stereotypes about older adults often include portrayals of inevitable and undesirable cognitive decline (Barber 2017; Hummert et al. 1994). That perception, however, was called into question when a longitudinal study out of the University of Minnesota identified the perfect cohort of individuals for studying cognitive decline—Catholic nuns who were members of the same order—the School Sisters of Notre Dame. The nun study is a longitudinal study from which dozens of empirical articles have been published, contributing to our understanding of cognitive decline, and methods for prevention. In 1986, psychologists began this project with 678 nuns, and they followed their cognitive and neurological health over several years (Snowdon et al. 1996). The nuns served as perfect subjects because the conditions they lived in were as close as one can get to a laboratory setting in the real world, given that the rules of the order made their lives similar in a number of important ways. The nun cohort allowed the researchers to control for several potential confounding variables: none of them had a history of drug of alcohol use, there were no pregnancies, and their daily actions were routine and easily documented.

One finding that was published early in the study was particularly relevant to brain training practices (Snowdon et al. 1996). Researchers coded autobiographies written by the nuns when they were around 22 years of age to quantify overall linguistic ability. Then, an average of 58 years later, the same nuns were given a battery of cognitive tests to determine the relationship between early adulthood linguistic ability, and later cognitive decline. Results revealed a strong relationship

between early life cognitive ability (quantified as linguistic ability) and cognitive function later in life (quantified by performance on cognitive tests and presence of neurodegenerative diseases). Nuns with higher abilities earlier in life fared better later in life. They also found that some nuns who maintained excellent cognitive functioning later in life had signs of Alzheimer's disease pathology post-mortem. These findings were interpreted as suggestive of the fact that nuns who remained mentally active could stave off the symptoms of age-related pathology. This interpretation provided strong motivation for promoting brain health and to keep our minds active as we age.

Brain Training Products and Media Perception

As the nun study gained prominence and media coverage, there was an explosion of brain training products in the early 2000s, and research examining their efficacy soon followed. There are now dozens of different brain training products available in the market, with many of the biggest companies providing computer-based brain training tasks. While some companies have published a notable amount of research on their interventions, others remain untested. Many popular brands have failed to produce any peer reviewed evidence in support of their interventions (Simons et al. 2016). Yet these interventions are still readily marketed and widely purchased.

As a result, many brain training programs marketed at preventing decline include game-like training activities, along with educational videos and tips; however, many also include assessments of one's current brain health and trajectory to allow for "personalized care." Most companies highlight multiple articles showing their product works on their websites and in other marketing materials.

The relationship between empirical evidence and what is marketed has been examined by some governmental agencies. In 2016, the U.S. Federal Trade Commission charged Lumosity, a brain training company, with deceptive advertising; they reached a settlement with Lumosity and the company agreed to pay $2 million ("Lumosity to Pay $2 Million" 2016). The FTC also required the company that owns Lumosity to produce empirical research before making similar claims in the future. Lumosity markets online brain training games and their website indicates they have since published around 20 peer reviewed publications with thousands of participants showcasing the efficacy of their product. For example, according to one study mentioned on their site, after 10 weeks of their program, participants improved on several cognitive variables (Hardy et al. 2015).

The Lumosity case posed seemingly simple questions that can be asked about all brain training products—do brain training games work, and how can we test their efficacy? To help answer this question, Simons et al. (2016) provided a comprehensive meta-analysis of the evidence related to brain training programs. Overall, the authors of this meta-analysis summed up the available research literature by concluding that they found "extensive evidence that brain-training interventions improve performance on the trained tasks, less evidence that such interventions improve performance on closely related tasks, and little evidence that training enhances performance on distantly related tasks or that training improves everyday cognitive performance" (p. 103).

Outlets such as *The Atlantic* highlighted this prominent meta-analysis, and several outlets weighed in (Aamodt and Wang 2007; Howard 2016; Yong 2016). Companies selling the products critiqued the paper by focusing on the possible biases of the authors, while other researchers noted the value of the major review for informing future studies (Yong 2016). CNN also published an article noting the release of Simons et al.'s (2016) paper and its impacts on the scientific community (Howard 2016).

While the two articles covered some similar points—the lack of compelling evidence, and the volume of studies included in this review—the CNN article also focused on a separate review that highlighted the potential for placebo effects (Foroughi et al. 2016; Howard 2016). Foroughi et al. (2016) found that participants who responded to a flyer advertising cognitive training improved 5–10 IQ points after only one session of training, whereas those responding to a neutral flyer showed no improvement. Thus, they argued that due to a lack of understanding surrounding the mechanism of cognitive training, researchers cannot rule out placebo effects as a reason for the effects of cognitive training. The publication of these articles, letters from both sides of the debate, and the growing market for brain training products have pushed this discourse into the mainstream.

Brain Training Research

Limitations for Consideration

Generalizability. Many reviews of brain training literature note important limitations to our current understanding. The first limitation is that there are simply too many interventions, and not enough studies conducted on all of them. While each study may be able to address whether a particular intervention is somewhat effective, this information should not be generalized to all brain training. Katz et al. (2018) draw a helpful analogy here by comparing brain training research to that of medicine. If doctors asked the general question "does medicine work?" and then tested this by running trials on specific kinds of medication, they would fail to answer the primary question in earnest. The same thing is happening in brain training research. We can answer the question "what is the effect of this particular intervention on certain outcomes?" but we have not yet answered the question, "Does brain training work?"

Near vs. Far Transfer. It is known with some certainty that brain training in a specific area (e.g., attention) can be successful in improving one's ability in that same area, but the benefits of training do not always transfer to other domains of executive function (Diamond 2012; Katz et al. 2018; Owen et al. 2010; Simons et al. 2016; Uddin and Reyes 2021). So, if one completes an intervention targeted at improving attention, it's likely that one's performance on attention tasks will

improve, but performance on tests of other cognitive abilities, such as memory, might not. This inability for improvement in one cognitive area to lead to improvement in another area highlights an important concept in brain training known as transfer.

Transfer is generally categorized into two realms: near transfer and far transfer. Near transfer occurs when someone is trained in one skill successfully and their ability in that area is improved, and highly similar skills might also benefit. For example, learning to play the piano might improve fine motor coordination in the hands, which may transfer to similar skills such as typing. Far transfer occurs when someone is trained in a particular skill, and this training also improves their ability in a fairly different skill. For example, far transfer would explain why learning to play the piano might also benefit mathematical reasoning or vocabulary, skills that seem unrelated. Often brain training interventions are successful in accomplishing near transfer, but the evidence for far transfer is elusive (Melby-Lervåg et al. 2016; Melby-Lervåg and Hulme 2013; Minear et al. 2016). Despite minimal evidence for far transfer in brain training interventions, many companies market their products broadly as programs designed to "keep you sharp" or are targeted at families who want to boost their child's academic and career success. These claims are largely unfounded.

Samples. In addition to the issue of generalizability, samples are often too small to conduct the complex analyses studies carry out. Most studies are limited in their ability to recruit participants, which often means the studies are underpowered. Individual demographic differences may also be contributing to the different outcomes seen across studies. Interventions may be significant for individuals with cognitive impairments, but non-significant outside of clinical populations. The quality of data collection and intervention implementation in larger samples along with the minimal testing of "real life" applicable outcomes have also been scrutinized. Katz et al. (2018) note that most benefits of brain training are measured using standardized laboratory measures and few ecologically valid methods. Lastly, we note that brain training methods involve simple tasks performed in limited contexts (i.e., short computer games that involve minimal substantive knowledge) and yet companies commonly promote general benefits and cite testimonials from clients as evidence of these effects (Simons et al. 2016).

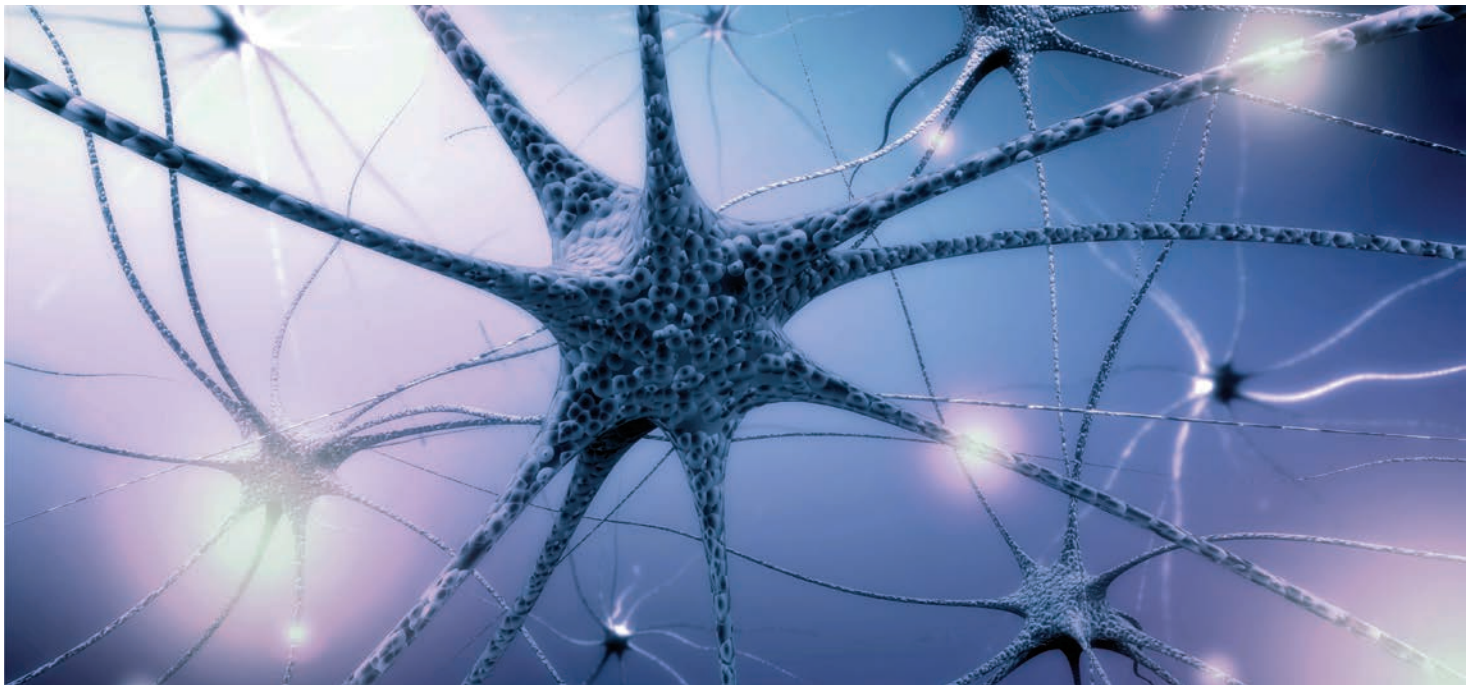
Active Control Groups. One of the most comprehensive reviews of brain training research to date was published by Simons et al. in 2016. This review examined evidence presented on behalf of, and in critique of brain training research by evaluating 132 trials. Of these studies, the article reported 71 that utilized random assignment in their design. This is important, as those that fail to utilize random assignment cannot be considered true experiments, and while they may provide some insight, the limitations of this study design are ample.

Of the studies that use random assignment, 22 compared interventions to a passive control, and 49 compared interventions to an active control. Passive control groups are experimental groups that do not undergo any kind of intervention, whereas active controls engage in a program that is comparable to the experimental intervention, without the factor thought to drive the effect. Studies using passive controls found some effect for trained or similar tasks, but limitations of sample size and participant demographics make generalizing results unwise.

In addition, when you have a passive control group, you need to consider expectation effects: since the participants in the experimental group know that they are receiving some kind of intervention, they might try harder on the subsequent tests, or have more self-confidence, or there might be other factors that explain superior performance. That is why an active control group is critical in studies evaluating brain training tools.

Unfortunately, the active control studies provided little evidence for improvement outside of speed of processing tasks, in related and unrelated domains. Additionally, effect sizes were often small, meaning even when results were statistically significant, they may be of little practical significance.

Physical Exercise. While brain training activities do seem to have some promising effects, physical exercise has also been known to improve cognitive functioning, well-being, and prevent neurodegeneration, and there is ample research in this area (Mandolesi et al. 2018). The evidence in support of the positive effects of exercise is quite robust, and physical exercise produces many of the results sought after by brain training programs. It can promote neuroplasticity and improve performance in behavioral tasks (Mandolesi et al. 2018).



Whereas brain training programs may be more of a gamble, physical exercise is a promising intervention for those looking to enhance or prevent decline in cognitive performance. This evidence begs the question, compared to exercise, is brain training an effective intervention?

Questions to Consider

One major critique of brain training research is that, while researchers can observe that brain training is influencing cognition, they do not understand much about how or why this happens. Very few interventions have generated general cognitive improvement that transfers to desirable real-world outcomes. Theories about the nature of skill transfer generally fall into two overarching frameworks: the first is formal discipline theory, and the second is the theory of transfer by identical elements (Simons et al. 2016). The formal discipline framework posits that the mind consists of various abilities that we can improve with practice, and so it follows that with training, one can theoretically improve the mind. Formal discipline theory was challenged by Edward Thorndike who proposed the theory of transfer by identical elements, which proposed that skills acquired in training are closely linked to the stimuli and tasks required during learning. This theory highlighted the importance of context for transfer. That is, when conditions of training mimics the conditions or context in which those skills will be used, transfer is more likely. Modern views of transfer often include considerations of context and skill malleability when considering how training/learning will manifest in different domains (Simons et al. 2016). Brain training interventions have put these theories to the test to see what abilities we can improve, and if this improvement transfers to multiple domains.

There seems to be consensus about the role of transfer in brain training, that near, or "superficial" transfer may occur, but the evidence for far transfer is minimal at best (Katz et al. 2018). For example, working memory could be improved by training, but working memory training does not lead to improvements in other domains (Melby-Lervåg et al. 2016; Melby-Lervåg and Hulme 2013; Minear et al. 2016). An issue that arises here is the possibility that participants are not actually improving their working memory but are instead learning superficial strategies that help them improve their performance on specific tests of working memory. Thus, we are left wondering, is there a true test of near transfer, or is it currently indistinguishable from the acquisition of superficial strategies that lead to performance improvements? Meta-analyses by Owen et al. (2010) and Simons et al. (2016) came to the same conclusion about near vs. far transfer and asked: what is the true difference between near and far transfer? How do we make distinctions between related "near transfer" tasks and non-related "far transfer" tasks in a way that is not subjective or arbitrary? (Owen et al. 2010; Simons et al. 2016).

Past research on brain training has focused heavily on the question of *if* brain training works, and this has yielded important findings. Some studies and meta-analyses have concluded that brain training may be effective for people with cognitive impairments (Bonnechère et al. 2020; Hill et al. 2017; Lawrence et al. 2017; Leung et al. 2015); however, many reviewers remain skeptical and most believe more research is necessary to reach consensus (Gates et al. 2019; Nguyen et al. 2021). Effects in specific samples are easier to identify, but when we attempt to generalize these findings across all demographics, some gaps in knowledge appear.

Summary and Conclusion

There is likely little harm in engaging in brain training exercises, but the benefits are not entirely clear, and if time or energy are at a premium, older adults or those at risk of de-

veloping mild cognitive impairment might be better served spending it engaging in physical exercise or in social interactions. We can conclude evidence of near transfer exists, and many interventions can improve abilities in a particular domain, but what are the implications for practical, real-world outcomes? Brain training remains a highly debated topic in academic and mainstream discourse, with one point most sides can agree on—more data are necessary. Limitations of sample, design, and generalizability make it difficult to generate larger claims about efficacy. Often there is a stark contrast between evidence for brain training, and what is being marketed to the public. Yet, the brain training industry continues to grow, and new tools are entering the market regularly. In order to make informed decisions, consumers need to understand transfer, the importance of active control groups, and the effectiveness of other interventions, including physical exercise and a social support network. ■

Note

This article originally appeared as a book chapter in *Investigating Pop Psychology: Pseudoscience, Fringe Science, and Controversies* (Hupp and Wiseman, 2023). Thank you to the authors, Richard Wiseman, and Routledge Press for granting permission to reprint the chapter in Skeptical Inquirer as a feature article.

References

Aamodt, S., and S. Wang. 2007. Exercise on the brain. *The New York Times* (November 8). Online at https://www.nytimes.com/2007/11/08/opinion/08aamodt.html.

APA Dictionary of Psychology. N.d. Online at https://dictionary.apa.org/cognitive-ability.

Barber, S.J. 2017. An examination of age-based stereotype threat about cognitive decline: Implications for stereotype-threat research and theory development. *Perspectives on Psychological Science* 12(1): 62–90..

Berger, E.M., E. Fehr, H. Hermes, et al. 2020. The impact of working memory training on children's cognitive and noncognitive skills. *Social Science Research Network*. Online at https://papers.ssrn.com/abstract=3622337.

Bonnechère, B., C. Langley, and B.J. Sahakian. 2020. The use of commercial computerised cognitive games in older adults: A meta-analysis. *Scientific Reports* 10(1): 15276. Online at https://doi.org/10.1038/s41598-020-72281-3.

Diamond, A. 2012. Activities and programs that improve children's executive functions. *Current Directions in Psychological Science* 21(5): 335–341. Online at https://doi.org/10.1177/0963721412453722.

Foroughi, C. K., S.S. Monfort, M. Paczynski, et al. 2016. Placebo effects in cognitive training. *Proceedings of the National Academy of Sciences* 113(27): 7470–7474. Online at https://doi.org/10.1073/pnas.1601243113.

Gates, N.J., R.W. Vernooij, M. Di Nisio, et al. 2019. Computerised cognitive training for preventing dementia in people with mild cognitive impairment. *The Cochrane Database of Systematic Reviews* 3: CD012279. Online at https://doi.org/10.1002/14651858.CD012279.pub2.

Hardy, J.L., R.A. Nelson, M.E. Thomason, et al. 2015. Enhancing cognitive abilities with comprehensive training: A large, online, randomized, active-controlled trial. *PLoS One* 10(9): e0134467. Online at https://doi.org/10.1371/journal.pone.0134467.

Hill, N.T.M., L. Mowszowski, S.L. Naismith, et al. 2017. Computerized cognitive training in older adults with mild cognitive impairment or dementia: A systematic review and meta-analysis. *The American Journal of Psychiatry* 174(4): 329–340. Online at https://doi.org/10.1176/appi.ajp.2016.16030360.

Howard, B.J. 2016. Do brain-training exercises really work? CNN (October 20). Online at https://www.cnn.com/2016/10/20/health/brain-training-exercises/index.html.

Hummert, M.L., T.A. Garstka, J.L. Shaner, et al. 1994. Stereotypes of the elderly held by young, middle-aged, and elderly adults. *Journal of Gerontology* 49(5): P240–P249. Online at https://doi.org/10.1093/geronj/49.5.p240.

Katz, B., P. Shah, and D.E. Meyer. 2018. How to play 20 questions with nature and lose: Reflections on 100 years of brain-training research. *Proceedings of the National Academy of Sciences* 115(40): 9897–9904. Online at https://doi.org/10.1073/pnas.1617102114.

Lawrence, B.J., N. Gasson, R.S. Bucks, et al. 2017. Cognitive training and noninvasive brain stimulation for cognition in Parkinson's disease: A meta-analysis. *Neurorehabilitation and Neural Repair* 31(7): 597–608. Online at https://doi.org/10.1177/1545968317712468.

Leung, I.H.K., C.C. Walton, H. Hallock, et al. 2015. Cognitive training in Parkinson disease: A systematic review and meta-analysis. *Neurology* 85(21): 1843–1851. Online at https://doi.org/10.1212/WNL.0000000000002145.

Lumosity to Pay $2 Million to Settle FTC Deceptive Advertising Charges for Its "Brain Training" Program. 2016. Federal Trade Commission. Online at https://www.ftc.gov/news-events/press-releases/ 2016/01/lumosity-pay-2-million-settle-ftc-deceptive-advertising-charges.

Mandolesi, L., A. Polverino, S. Montuori, et al. 2018. Effects of physical exercise on cognitive functioning and wellbeing: Biological and psychological benefits. *Frontiers in Psychology* 9: 509. Online at https://doi.org/10.3389/fpsyg.2018.00509.

Melby-Lervåg, M., and C. Hulme. 2013. Is working memory training effective? A meta-analytic review. *Developmental Psychology* 49(2): 270–291. Online at https://doi.org/10.1037/a0028228.

Melby-Lervåg, M., T.S. Redick, and C. Hulme. 2016. Working memory training does not improve performance on measures of intelligence or other measures of "far transfer": Evidence from a meta-analytic review. *Perspectives on Psychological Science* 11(4): 512–534. Online at https://doi.org/10.1177/1745691616635612.

Minear, M., F. Brasher, C.B. Guerrero, et al. 2016. A simultaneous examination of two forms of working memory training: Evidence for near transfer only. *Memory & Cognition* 44(7): 1014–1037. Online at https://doi.org/10.3758/s13421-016-0616-9.

Nguyen, L., K. Murphy, and G. Andrews. 2021. A game a day keeps cognitive decline away? A systematic review and meta-analysis of commercially-available brain training programs in healthy and cognitively impaired older adults. *Neuropsychology Review*. Online at https://doi.org/10.1007/s11065-021-09515-2.

Owen, A.M., A. Hampshire, J.A. Grahn, et al. 2010. Putting brain training to the test. *Nature* 465(7299): 775–778. Online at https://doi.org/10.1038/nature09042.

Simons, D.J., W.R. Boot, N. Charness, et al. 2016. Do "brain-training" programs work? *Psychological Science in the Public Interest* 17(3): 103–186. Online at https://doi.org/10.1177/1529100616661983.

Snowdon, D.A., S.J. Kemper, J.A. Mortimer, et al. 1996. Linguistic ability in early life and cognitive function and Alzheimer's disease in late life. Findings from the Nun Study. *Journal of the American Medical Association* 275(7): 528–532.

Uddin, L.Q., and A.D.L. Reyes. 2021. Cultivating allyship through casual mentoring to promote diversity. *Trends in Cognitive Sciences* 25(10): 813–815. Online at https://doi.org/10.1016/j.tics.2021.07.014.

Yong, E. 2016. The weak evidence behind brain-training games. *The Atlantic* (October 3). Online at https://www.theatlantic.com/science/archive/2016/10/the-weak-evidence-behind-brain-training-games/502559/.

M.J. Schneider, BA, is a PhD student at the University of Washington studying identity and policy. Schneider graduated with a BA in psychology from the University of San Francisco and worked as a Post-Baccalaureate Lab Manager for the Princeton Social Neuroscience Lab.

Indre V. Viskontas, PhD, is a cognitive neuroscientist and associate professor at the University of San Francisco. She is the cohost of the *Inquiring Minds* podcast and author of the book *How Music Can Make You Better* (Viskontas, 2019).

A Skeptical Approach to Guilt and Innocence in the Judicial Realm

Criminal justice is theoretically based on dispassionate, logical analysis of facts in evidence. An empirical, skeptical viewpoint can help us to understand why this is frequently not the case.

MATTHEW J. SHARPS, KYLE VILLARAMA, FRANKIE RIOS, AND JANA L. PRICE-SHARPS

The criminal justice system, in theory, must be impartial. The only admissible considerations within the system, in theory, are intended to derive from a dispassionate weighing of facts in evidence.

This dispassionate, logical approach—deriving in many ways from Enlightenment philosophy—is frequently taken for granted, at least implicitly. Yet the realm of criminal justice is fraught with anomalies, many of which have their roots in human psychology rather than in the abstractions of legal theory.

Major cases attest to this fact. The Scott Peterson criminal trial of 2004, in which Peterson's pregnant wife was murdered, resulted in Peterson's conviction for the crime despite there being no direct physical evidentiary connection from the crime to Peterson. The Wesson multiple murder of Marcus Wesson's own children in Central California, also in 2004, did provide direct evidentiary connections, but some specific connections were incompletely or inaccurately conveyed to the jury.

The juries convicted.

Such anomalies pose some difficulty because the proceedings in criminal investigations and trials are supposed to be based, quite literally, on *skeptical inquiry*. In line with the most basic principles governing the activities of the Committee for Skeptical Inquiry, the judicial context is supposed to be based only on logic and evidence. And yet both Wesson and Peterson were convicted, apparently with minimal consideration of these specific facts. This is certainly not to second-guess the juries in these particular cases and absolutely *not* to imply that Wesson and Peterson were wrongly convicted. But from the standpoint of pure scientific skepticism, these convictions serve to demonstrate that criminal justice proceedings are not necessarily based purely on hard logic and evidence or on the requisite and expected skeptical inquiry. Implicitly, of course, we all understand this, but at a more direct, explicit level, other factors are clearly involved, and we need to know what they are.

Questions of Guilt and Innocence

It is especially important to understand these factors in cases in which guilt and innocence become confused in the judicial process. This happens far more frequently than one might expect. Clearly guilty individuals may be found not guilty due to "mitigating" factors, which in some cases are clearly legitimate but in others may bear no genuine relationship to the given crime.

The opposite effect is also observed; frequently, the victims of crimes are seen as at least partially responsible for their victimization ("she led him on," "he shouldn't have been there at that time of night," and so on). It's an odd fact that victims are frequently blamed, at least in part, for the crimes committed against them (e.g., Karmen 2004). Yet given that the victim broke no laws in such cases and the perpetrator did, we cannot search for the source of these ideas in law or logic. So, what are the sources of these frequently egregious assertions?

It has been suggested that "blaming the victim" is an extension of the "just-world hypothesis" (e.g., Lerner and Miller 1978; Lerner 1980), the concept that we essentially get what we deserve, which would imply victim guilt. As Lerner has stated, this concept is functionally and fundamentally delusional, the antithesis of the result of a proper skeptical inquiry. Yet it frequently takes hold, to the significant disadvantage of crime victims (Martin 2001) and is especially prevalent in domestic abuse situations (e.g., Danis 2003; Garimella et al. 2000).

Stephen Goldinger and colleagues (2003) have also shown the importance of *imagination*—by definition, irrelevant to the facts in evidence—in judicial consideration of domestic and/or sexual abuse. The importance of imagination was also demonstrated in a taxonomic study of cognitive effects in the consideration of violent crime (Sharps et al. 2009). Second only in frequency to simple errors of the appearance of the suspect were *errors of the imagination*; respondents simply and unknowingly made up "facts" about what they had seen *that had no actual basis in physical reality*. The source of these errors lay in the creative powers of the respondents' own minds.

Other important studies (e.g., Pugh 1983; George and Martinez 2002; Rude 1999) have demonstrated the importance of victims' previous actions and backgrounds to the outcomes of cases in which victim history was completely irrelevant to the attribution of blame.

Just-world hypothesis, imagination, and victim backgrounds: From an empirical standpoint, perhaps the most important basis of skeptical inquiry, what specific factors might result in the inadvertent incorporation of such nebulous influences into judicial proceedings?

Cognitive science (e.g., Chi et al. 1982) has for many years converged on the concept that successful, relatively sophisticated consideration of any given situation involves accurate *classification* of the elements and processes involved. In questions of guilt and innocence, we can classify potentially extraneous influences in two broad categories: those pertaining to the *context* of the consideration and those pertaining to *personal individual differences* in those engaged in it. There are many such possible influences within each category, of course, but which are most likely here? What psychological influences have been suggested, by prior empirical research, to be of potential importance to the decidedly non-skeptical hijacking of considerations of logic and evidence by extraneous psychological forces?

A Contextual Influence: Violence

Both the Peterson and Wesson cases were truly horrifying, presenting terrible scenarios of the violent death of children, born and unborn, to the jurors. It has been demonstrated (e.g., Sharps, Herrera, and Price-Sharps 2013) that the relative level of horror presented by a given case is highly influential in the consideration of that case. In that research, respondents were more likely to return a guilty verdict for a given suspect based solely on the violence of the crime in question; suspects in more violent cases were more likely to be judged as guilty, even without any additional evidence indicating guilt. It was also shown that respondents were more likely to overlook flaws and gaps in evidence in more violent cases. There is a clear link between the cognitive consideration of facts in evidence and the affective state that those facts may produce in a given potential juror: higher levels of violence result in more "gestalt," holistic consideration of the given case, involving less "feature-intensive" consideration that would anchor a respondent's cognitive processing more firmly to the facts in evidence and less to the more nebulous constructs potentiated by the relative violence of the situation. In purely cognitive terms, then, we would see a potential connection to questions of guilt and innocence here: blaming the victim would be less likely under greater conditions of violence, in which the victim might be seen as receiving more punishment than he or she "deserved" under the just-world concept (e.g., Lerner 1980).

A Personal Influence: Dissociation

Dissociation, as we've discussed in previous articles we've been privileged to present in Skeptical Inquirer, is emphatically not confined to pathological conditions such as dissociative identity disorder. Dissociation, in its *subclinical* form, may occur in *anyone* in the absence of any identifiable psychopathology (see Sharps 2022).

Why would we expect dissociation to influence considerations of guilt and innocence? Even subclinical dissociation produces important effects on human cognition. Dissociated people may feel "strange" about themselves and their environment and have anomalous perceptions of their own experiences and of the passage of time. The world of the dissociated may be subjectively diffuse and somewhat unreal or perhaps surreal (e.g., Cardena 1997; DePrince and Freyd 1999), and dissociation can reduce the critical feature-intensive analysis on which a properly skeptical analysis of the facts of guilt or innocence would be predicated in any given case.

Dissociation in perfectly "normal" people can move beliefs and even perceptions beyond the hard constraints of logic and evidence. Dissociation is directly associated with unsupported paranormal beliefs (in such things as UFOs, Bigfoot, and ghosts; e.g., Sharps et al. 2010; see also Sharps 2022). Dissociation was strongly associated with beliefs in the 2012 "Mayan" end of the world, in which absolutely nothing happened (Sharps, Liao, and Herrera 2013, 2014); in another study, those with higher tendencies toward dissociation tended not only to *believe* in paranormal entities but actually *see* them, interpreting objects from everyday prosaic reality as paranormal in nature. For the dissociated, a teenager in a Halloween ape costume became Bigfoot, and the landing lights of a helicopter in the dark became an alien UFO (Sharps 2012). People experiencing dissociation were also more likely to see objects and structures that did not exist on a slightly blurred photo of Earth's Moon (Sharps et al. 2019). Dissociation is clearly involved in the blurring of reality with relatively vague, gestalt, nonspecific concepts deriving from the relatively uncritical inner life of the individuals involved; thus, we would expect dissociative tendencies in the individual, as well as violence in

the context of a given crime, to influence even fundamental issues of guilt and innocence in any given case.

Research Framework

We addressed these concepts in an experimental context. One hundred and fifty adult respondents each read one of three realistic, field-valid crime scenarios, developed with reference to actual criminal cases and assistance from expert veterans of law enforcement. The scenarios were identical, except in the following *contextual* detail: the first described a simple theft of a wallet; the second described the theft of the wallet but with serious physical assault also involved; and the third described the theft and the assault as resulting in murder. Thus, each respondent was provided with one of three levels of violence to consider.

The victim and perpetrator in each scenario were described as male, with no data on race provided. Respondents were asked to rate, on 1–7 Likert scales, the degree to which the perpetrator and the victim of the given crime bore responsibility for it. They also completed the Dissociative Experiences Scale-II (DES-II), a standard measure of dissociative tendencies (Carlson and Putnam 1986).

Findings

Violence

Scenario violence didn't influence the attribution of guilt to the perpetrator. However, the effect of violence *was* significant on attribution of responsibility to the *victim*; as suggested above, the victim was seen to be significantly more responsible for the theft of his own property (a wallet) if he was not assaulted or murdered during the theft (F [1,147] = 5.78, p < .01). However, there was no difference in the lower level of responsibility, or blame, attributed to the victim of violence, *whether he was assaulted or murdered*. In their consideration of the crime, respondents *did not differentiate between assault and murder*—yet this bizarre finding is consistent with previous studies (Sharps, Herrera, and Price-Sharps 2013; Liao et al. 2018) in which we observed high levels of confusion, on the part of respondents, in the evaluation of different levels and types of violence. In the consideration of violence, research indicates that most modern adults tend toward a gestalt, relatively amorphous style of cognition, a mode of thinking that may preclude the feature-intensive analysis on which a reasoned analysis of the nature and level of violence, in any given crime, would logically have to be based.

Dissociation

As suggested, dissociative tendencies were associated with the evaluation of guilt or innocence, and this relationship varied under different conditions of violence. Dissociative tendencies, as measured by the DES-II, did not predict greater levels of guilt attribution to the victim if he was simply robbed or even assaulted. However, dissociation was significantly associated with greater attribution of victim responsibility if he was murdered, (R^2 = .146, F [2, 40] = 3.41, p < .05, β= .214). Dissociation interacted with the level of violence to influence judgment *only at the highest level of violence examined, homicide*; only persons exhibiting relatively high levels of dissociative tendencies saw the victim as relatively responsible, blamable, if he was murdered. In the presence of theft or even grievous bodily harm, dissociation did not play a role in assigning blame to the victim; you had to be dissociated to decide that the victim was guilty of his own murder.

Dissociation was also associated with lower levels of guilt attributed to the perpetrator of the crime, without regard to violence (R^2 = .045, F [1, 133] = 6.23, p < .05, β= -.213). Those who were more dissociated tended to see the perpetrator as less guilty of the crime he committed, a result that may, with further research, help to explain many cases in which guilty parties were exonerated in direct opposition to facts in evidence.

Conclusions and Implications

What are the cognitive dynamics by which jurors convict, or release, suspects who may or may not have committed specific crimes? The present findings demonstrate that a *contextual* variable, the level of violence involved in the given crime, interacts with a *personal* variable, the relative subclinical dissociation of the individual potential juror, to influence a legal question as foundational as the judicial assignation of guilt, or blame, to the victim and to the perpetrator of a given crime.

The findings of this study, as such, may be useful in clarifying the cognitive dynamics of such fundamental judicial considerations as guilt or innocence, including the perennially pernicious "blame the victim" effect; it is hoped that this research will have this effect. Other cognitive dynamics, of course, await further research; this should prove true both of contextual variables and of personal, individual-difference characteristics in the determination of cognitive outcomes in the criminal justice realm. It is hoped that the present research will also prove heuristic for future studies along these lines.

However, there is another major point to this research. This research highlights the critical importance of a truly *skeptical* approach to inquiry into the dynamics of the criminal justice system, especially in a world of increasingly complex legal and criminal realities. In the world of criminal justice, a realm of grave importance both to the welfare of individuals and to that of the society at large, skeptical inquiry has not yet approached its potential.

For example, eyewitness memory is known, from much empirical research, to be highly malleable (e.g., Bartlett 1932; Sharps 2022) and even to be influenced by the language used in the courtroom (e.g., Loftus 1979). Yet in most legal venues, sworn eyewitness testimony is still treated as veridical and adamantine.

Judges still order juries to disregard concepts recently planted by courtroom proceedings in their own memories, *even though the cognitive realities of memory processes may effectively render this impossible* (e.g., Sharps 2022), and that even elements of defendant *faces* may produce profound affective responses in jurors, *of which those jurors are themselves com-*

pletely unaware (Sharps and Herrera 2019).

We need to take a properly skeptical, empirical approach to the criminal justice system. We need to provide hard, skeptically driven data regarding the very ancient ideas, still implicitly in force, of a divinely sanctioned, essentially omniscient oath-driven system in which, in the modern world, many people take divine oaths extremely lightly. We need to examine the relevant questions from a classificatory perspective: What are the prospective psychological influences operating in any given functional sphere of operation?

Then, we need to address the scientific literature: What influences have been demonstrated to be important in functionally related realms of inquiry? Finally, we need to address each of these influences *in solidly designed experimental frameworks*, within which, and only within which, empirical validation of relevant theory is possible. Only then can a modern secular justice system, in continuous conflict with its ancient nonsecular antecedents, make progress in the modern realm of criminal justice. A system of analysis based in skeptical inquiry, quite literally, is essential to any modern system of justice.

The philosopher Socrates, essentially convicted for the crime of *skeptical inquiry* in ancient Greece, was convicted by a bare majority of his Athenian jurors. Ancient and modern sources differ slightly on the numbers involved, but after he was convicted, approximately eighty of the jurors who had previously voted for his innocence *voted for the death penalty*. Approximately eighty jurors, with the same brains as modern jurors, voted to kill the man *for the crime of which they'd previously voted him innocent*.

A hard skeptical approach to the legal and psychological realities of the criminal justice system is not only essential; it's more than 2,400 years overdue. ■

References

Bartlett, F.C. 1932. *Remembering: A Study in Experimental and Social Psychology*. Cambridge, UK: Cambridge University Press.

Cardena, E. 1997. Dissociative disorders: Phantoms of the self. In S.M. Turner and M. Hersen (eds.), *Adult Psychopathology and Diagnosis* (3rd ed.). New York, NY: Wiley, 400.

Carlson, E.B., and F.W. Putnam. 1986. Development, reliability, and validity of a dissociation scale**.** *Journal of Nervous and Mental Disorders* 174: 727–735.

Chi, M.T.H., R. Glaser, and E. Rees. 1982. Expertise in problem solving. In R.J. Sternberg (ed.), *Advances in the Psychology of Human Intelligence* (Vol. 1). Hillsdale, NJ: Erlbaum.

Danis, F.S. 2003. Domestic violence and social work education: What we know, what we need to know? *Journal of Social Work Education* 39: 215–224.

DePrince, A.P., and J.F. Freyd. 1999. Dissociative tendencies, attention, and memory. *Psychological Science* 10: 449–452.

Garimella, R., S.B. Plichta, C. Houseman, et al. 2000. Physicians, beliefs about victims of spouse abuse and about the physician role. *Journal of Women's Health and Gender-Based Medicine* 9: 405–411.

George, W., and L. Martinez. 2002. Victim blaming in rape: Effects of victim and perpetrator race, types of rape, and participant racism. *Psychology of Women Quarterly* 26: 110.

Goldinger, S.D., H.M. Kleider, T. Azuma, et al. 2003. 'Blaming the victim' under memory load. *Psychological Science* 14: 81–85.

Karmen, A. 2004. *Crime Victims: An Introduction to Victimology*. Belmont, CA: Wadsworth/Thomson.

Lerner, M.J. 1980. *The Belief in a Just World: A Fundamental Delusion.* New York, NY: Plenum Press.

Lerner, M.J., and D.T. Miller. 1978. Just world research and the attribution process: Looking back and ahead. *Psychological Bulletin* 85: 1030–1051.

Liao, S., J.L. Price-Sharps, and M.J. Sharps. 2018. Shoot/no-shoot decisions: Dissociation, judgment, and assailant/weapon characteristics. *Journal of Police and Criminal Psychology* 33: 209–214.

Loftus, E.F. 1979. *Eyewitness Testimony*. Cambridge, MA: Harvard University Press.

Martin, M.W. 2001. Responsibility for health and blaming victims. *Journal of Medical Humanities* 22: 95–106

Pugh, M.D. 1983. Contributory fault and rape convictions: Loglinear models for blaming the victim. *Social Psychology Quarterly* 46*:* 233–242.

Rude, D. 1999. Reasonable men and provocative women: An analysis of gendered domestic homicide in Zambia. *Journal of Southern Africana Studies* 25: 7–27.

Sharps, M.J. 2012. Eyewitness to the paranormal: The experimental psychology of the "unexplained." Skeptical Inquirer 36(4): 39–45.

———. 2022. *Processing under Pressure: Stress, Memory, and Decision-Making in Law Enforcement* (3rd ed.). Park City, UT: Blue 360 Media.

Sharps, M.J., and M.R. Herrera. 2019. The eyes really do have it: Attribution of character in the eyes of killers. *Journal of Police and Criminal Psychology* 34: 105–108.

Sharps, M.J., M.R. Herrer, and J.L. Price-Sharps. 2013. Situationally equivocal eyewitness evidence and the violence of crimes. *Journal of Investigative Psychology and Offender Profiling* 10. Online at https://doi.org/10.1002/jip.1398.

Sharps, M.J., S. Hurd, B. Hoshiko, et al. 2019. Percival Lowell and the Canals of Mars Part II: How to see things that aren't there. Skeptical Inquirer 43(6): 48–51.

Sharps, M.J., J. Janigian, A.B. Hess, et al. 2009. Eyewitness memory in context: Toward a taxonomy of eyewitness error. *Journal of Police and Criminal Psychology* 24: 36–44.

Sharps, M.J., S.W. Liao, and M.R. Herrera. 2013. It's the end of the world, and they don't feel fine: The psychology of December 21, 2012. Skeptical Inquirer 37(1): 34–39.

———. 2014. Remembrance of apocalypse past. Skeptical Inquirer 38(6): 54–58.

Sharps, M.J., E. Newborg, S. Van Arsdall, et al. 2010. Paranormal encounters as eyewitness phenomena: Psychological determinants of atypical perceptual interpretations. *Current Psychology* 29: 320–327.

Matthew J. Sharps is professor of psychology at the California State University, Fresno. He is the author of numerous papers and publications in cognitive and forensic cognitive science, including the 2022 book *Processing under Pressure: Stress, Memory, and Decision-Making in Law Enforcement (3rd ed.)*. He has consulted on eyewitness issues in numerous criminal cases and has published several articles in SI on the implications of eyewitness principles for erroneous observations and interpretations.

Kyle Villarama, PhD, and Frankie Rios are researchers at the Sierra Education and Research Institute, Fresno, California.

Jana L. Price-Sharps, PhD, is a licensed psychologist who specializes in trauma treatment with forensic and first-responder populations. She is a full-time faculty member at Walden University in the Forensic Psychology PhD program and a part-time faculty member in the Department of Psychology at the California State University, Fresno. She conducts research on interactive factors in forensic, clinical, and cognitive psychology.

War on Cancer: An Updated Progress Report for Skeptics

Efforts to reduce cancer's harm have made limited progress. Newly developed immunological drugs, including check point inhibitors, appear promising. But prevention is less costly and more effective.

REYNOLD SPECTOR

In 1971, President Richard Nixon and the U.S. Congress declared war on cancer. In 2016, President Barack Obama launched the Cancer Moonshot, a program to reduce cancer mortality and improve the lives of people with cancer. In 2010, I reviewed the progress of cancer therapy: its costs, efficacy, and adverse side effects (Spector 2010). I also proposed greater emphasis on the importance of preventive efforts.

I focus here on the progress since 2010 in adult cancer. Much of this is due to a new class of immunological drugs, principally check point inhibitors. I will attempt to place the facts in proper perspective after an overview of cancer data, the epidemiology, and treatment of adult cancer in the United States.

Cancer is and has been for many years the second most common cause of death in the United States, exceeded only by heart disease (Table 1). In contrast to heart disease and stroke, the death rates for which declined 70 percent and 78 percent, respectively, between 1950 and 2010, the death

Table 1

Leading Causes of Death, United States, 2006 (Heron et al. 2009) and 2020* (Murphy et al. 2021)

2006			2020	
Rank	Cause of Death	Number (%)	Cause of Death	Number (%)
1.	Heart Disease	631,636 (26.0)	Heart Disease	696,962 (20.8)
2.	Cancer	559,888 (23.1)	Cancer	603,350 (18.0)
3.	Stroke	137,119 (5.7)	COVID-19	350,831 (10.4)
4.	Chronic Lower Respiratory Diseases	124,583 (5.1)	Unintentional Injuries	200,955 (6.0)
5.	Unintentional Injuries	121,599 (5.0)	Stroke	160,264 (4.8)
6.	Diabetes	72,449 (3.0)	Chronic Lower Respiratory Diseases	152,657 (4.5)
7.	Alzheimer's Disease	72,432 (3.0)	Alzheimer's Disease	134,242 (4.0)
8.	Influenza and Pneumonia	56,326 (2.3)	Diabetes	102,188 (3.0)
9.	Kidney Disease	45,344 (1.9)	Influenza & Pneumonia	57,800 (1.6)
10.	Septicemia	34,234 (1.4)	Kidney Disease	52,547 (1.6)

*Deaths for 2020 are provisional estimates

rate for cancer declined only 11 percent (National Center for Health Statistics 2022; Elfin 2022). The declines in heart disease and stroke result from improved treatment and prevention, especially the decline in smoking and advances in the treatment of high blood pressure and atherosclerosis.

Cancer is the uncontrolled proliferation of abnormal cells. Although the body's normally functioning immune system destroys most incipient cancers, some malignant cells develop mechanisms that block or avoid host immune systems, enabling the cancer to grow. Cancers are commonly described and studied based on the organ (e.g., lung, colon) afflicted. Cancers arising in different organs may have different causes and clinical behaviors. Cancer is described as local, regional, or distant (metastases). The five most common cancers in men are prostate, lung and bronchus, colon and rectum, urinary bladder, and melanoma of the skin; in women, breast, lung and bronchus, colon and rectum, uterine corpus, and melanoma of the skin are most common.

The rate of uncontrolled cell proliferation varies among different cancers. Some—notably prostate and breast—may

Table 2

A. Five-Year Survival Rates for Selected Cancer Sites, All Stages (American Cancer Society 2010)

Site of cancer	1999–2005* (2010)#	2011–2017* (2022)#	Absolute Change in Percent over Twelve Years
Pancreas	6%	11%	5%
Lung	16%	22%	6%
Colon/rectum	65%	65%	0%
Urinary bladder	80%	77%	-3%
Breast	89%	90%	1%
Melanoma of skin	91%	93%	2%
Prostate	100%	98%	-2%

B. Five-Year Survival Rates for Selected Cancer Sites, Distant (Metastatic) Stage (American Cancer Society 2022)

Site of cancer	1999–2005* (2010)#	2011–2017* (2022)#	Absolute Change in Percent over Twelve Years
Pancreas	2%	3%	1%
Lung	4%	6%	2%
Urinary bladder	6%	6%	0%
Colon/rectum	11%	15%	4%
Melanoma of skin	15%	30%	15%
Breast	23%	29%	6%
Prostate	31%	31%	0%

*Years of diagnosis for included cases
#Final year of calculation

grow very slowly, and patients with these cancers may survive many years even without therapy. Others, such as lung and pancreas, progress more quickly. Responses to cancer treatment may be classified as complete (cure), partial, or no effect. Knowing if a patient has been cured is difficult because some patients who have had a complete response may relapse. Partial success is described in various ways. A few examples from clinical studies include 1) median survival (that is, when half the patients have died); 2) overall survival at one year, two years, or five years; or 3) time to tumor progression.

At the population level, progress is also measured in several ways. Monitoring incidence rates assesses progress in the prevention of cancer. Mortality rates may be reduced either by prevention or improved treatment. Five-year survival rates, the proportion of individuals who live five years or more after initial diagnosis, primarily assess progress in cancer treatment (Maruvka et al. 2014). In recent years, aside from the absolute increase of 15 percent in the five-year survival rates among patients with distant metastases of melanoma, the small changes in five-year survival rates suggest limited therapeutic success (Table 2). Long-term trends in cancer death rates are displayed in Figures 1 and 2.

Methodology: Accuracy and Generalizability

Data used to guide and monitor our efforts to reduce morbidity and mortality of cancer fall into two general categories: surveys and special studies to monitor trends and research to identify safe and effective treatments. A third general category, etiologic research, is also important but contributes little to our discussion about trends and treatment.

Information about the size and changes in the size of the problem over time come primarily from public sources such as death certificates for mortality rates and the federally sponsored Surveillance, Epidemiology, and End Results Program

for incidence and survival data. The American Cancer Society commonly presents and summarizes these data in useful formats. Data from these sources are generally reliable but may be misleading. Consider, for example, a patient whose cancer is detected in a screening program and then treated. If the cancer is a slowly growing cancer, the treatment would appear to extend the patient's life even if the treatment is totally ineffective. Regardless of the efficacy of the treatment, the patient's life may appear to be extended simply because the cancer was detected at an earlier stage than it otherwise would have been. This type of error is referred to as *lead-time bias*.

Research to identify safe and effective treatments face several challenges. Even potentially promising treatments identified in well-conducted studies likely have limitations that restrict their impact. For example, research studies often limit participation to healthy subjects making it impossible to know whether the treatment would benefit subjects who may be older or less healthy. Similarly, all studies include subjects who, for various reasons, may be subsequently lost to follow up.

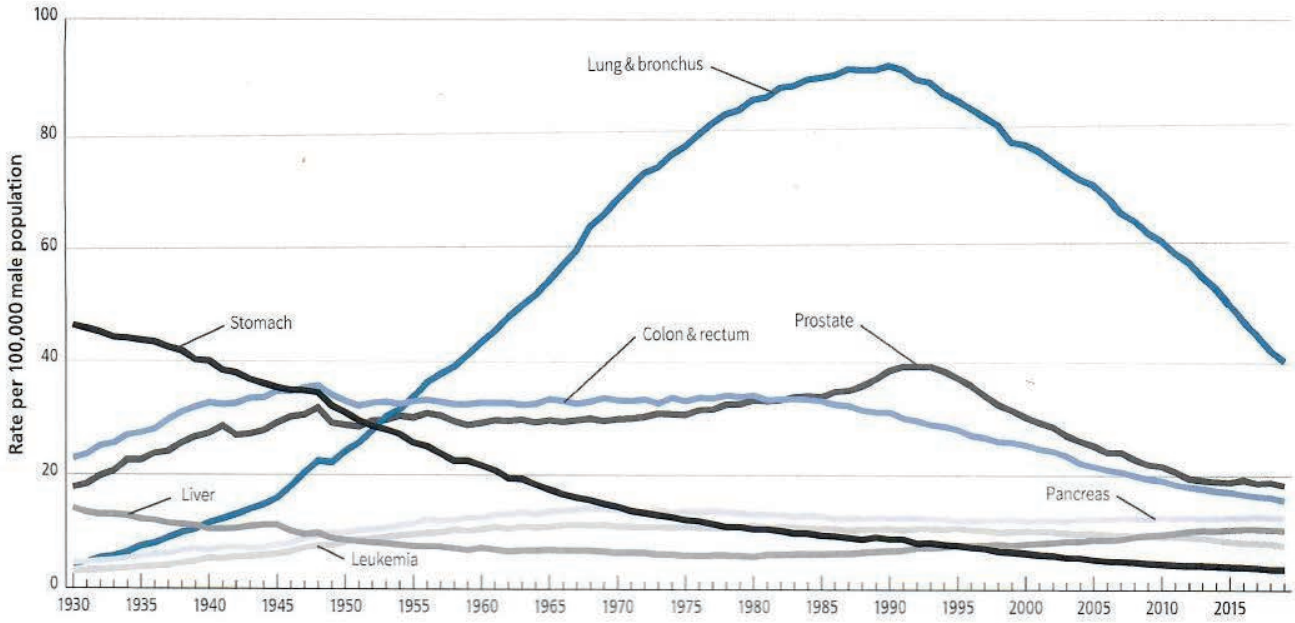


Figure 1. Trends in Age-Adjusted Cancer Death Rates by Site, Males, US, 1930–2019 (American Cancer Society 2022)

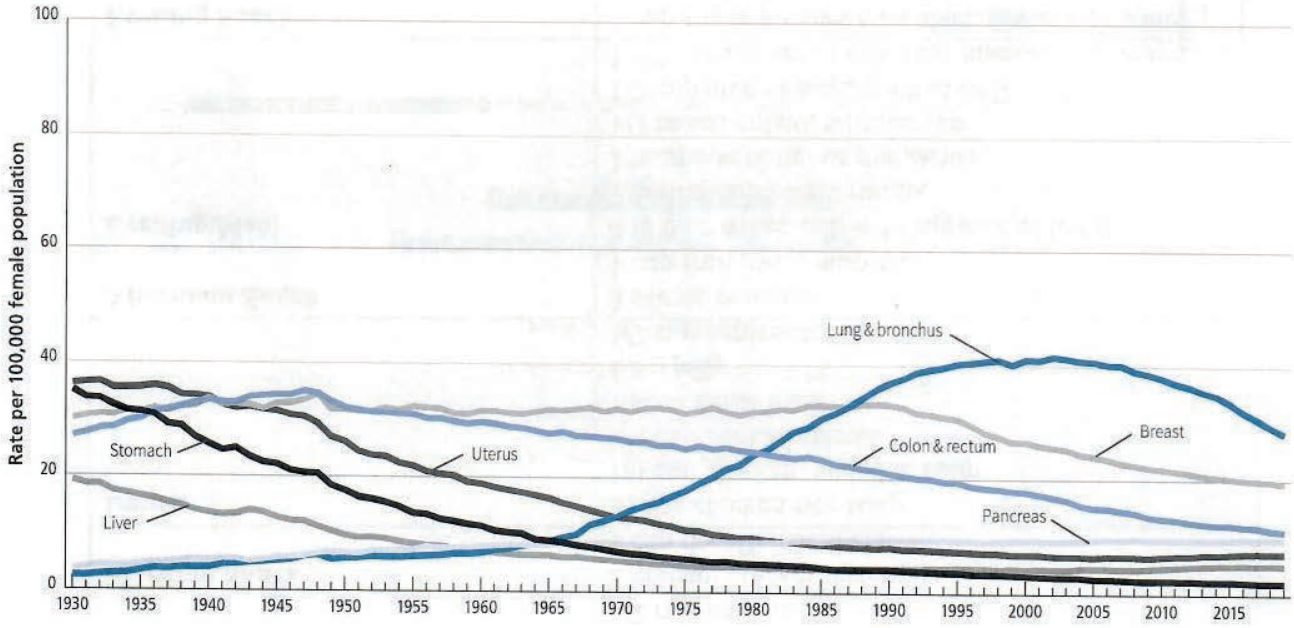


Figure 2. Trends in Age-Adjusted Cancer Death Rates by Site, Females, US, 1930–2019 (American Cancer Society 2022)

Statistical manipulations are available to estimate the impact of these losses, but the true impact cannot be known.

Moreover, many of the trials discuss what happens to responders but *not* non-responders. For example, in a trial in which 50 percent respond, discussing only what happens to the 50 percent who respond does not recognize the outcomes of the non-responders. Over the duration of a clinical trial, the number of patients who are alive declines. Especially for cancers with high mortality, the value of the data from the surviving patients is uncertain. These types of questions are often overlooked. Thus, readers should be cautious in dealing with "statistically significant" differences, especially when the treatment effect is small.

An example of this problem is pembrolizumab (brand name Keytruda). The drug was given accelerated approval by the Food and Drug Administration (FDA) for small cell carcinoma of the lung based on a small study. However, a large controlled study did not support the findings, and the indication for use of the drug was removed. This represents a form of publication bias where studies with positive findings, even with important weaknesses, are more likely to be published than studies with negative findings.

Treatment

The objectives of cancer therapy are: 1) cure, 2) prolongation of life, 3) improvement of quality of life, and 4) value of treatment compared to cost. In terms of the value of prolongation of life, it is my view that prolongation of life with a median survival of at least six months with minimal adverse effects is a solid advance.

The primary strategy in the treatment of cancer is to remove or kill as many cancer cells as possible. However, on occasion cancer treatments are used as palliative care in hospice settings. Types of therapy include surgery, radiation, chemotherapy, and immune therapy. Often, a combination of therapies is used. If the disease is caught early and can be removed, surgery is generally preferred. However, metastatic disease requires measures beyond surgery.

Radiation therapy and chemotherapy tend to be nonspecific, damaging normal cells in addition to cancer cells, especially the more rapidly dividing cells such as bone marrow and the lining of the GI tract. Common side effects include risk of infection, easy bruising or bleeding, loss of hair, nausea, and vomiting. Several recently developed chemotherapeutic agents are small molecules with more specific action and fewer side effects that block receptors and/or processes essential for cellular division. Imatinib (branded Gleevec) for chronic myelogenous leukemia is an example.

Immunotherapy

Normally, the body's immune system detects and destroys nascent malignancies. In recent years, progress has been made utilizing immunologic mechanisms to treat advanced tumors. In the complex contest between the immune system and malignancies, however, the cancer cells are not passive. They may develop systems that obscure the sites at which the body's antibodies damage the cancer cells or disarm the body's cells that are attacking them. In addition, cancer genotypes and cell types may be different in the metastases than in the primary tumor because, like the coronavirus, they adapt to the local situation to enhance survival.

Two general strategies are in current use: developing antibodies to attack the cancer cells and developing antibodies, called checkpoint inhibitors, to protect the host immune cells that attack the cancer cells. A third, infusing tumor-infiltrating lymphocytes (TILs), is under study. Limited information

suggests TILs may increase progression-free and survival time for patients who are refractory to checkpoint inhibitor therapy. All subjects, however, have experienced severe or greater side effects (Rohaan et al. 2022).

Antibodies against receptors on the cancer cell surface were developed first. The first of these, trastuzumab (Herceptin), was approved in the United States in 1988 and the European Union in 2017. This is a whole monoclonal antibody from mice but "humanized" so it wouldn't be rejected by the innate immunological systems in humans. Trastuzumab is effective against the 20–30 percent of breast cancer tumors in which the epithelial receptor B2 gene (HER2) is overexpressed. The FDA requires evidence of the expression of the receptor for use of the drug to be considered an approved. In a large trial among women with overexpressed HER2 (Cameron et al. 2017), trastuzumab increased the ten-year disease-free survival rate from 63–69 percent. The actual increase is probably greater because more than half of the patients assigned to the control group crossed over to receive trastuzumab.

Unfortunately, not unlike most other drugs used to treat cancer, trastuzumab has several drawbacks. If used alone, resistance to the drug develops quickly, undercutting its utility. In addition, the incidence of serious heart problems was about 3 percent per year of treatment compared with 1 percent overall in the comparison group (Cameron et al. 2017). Finally, the drug costs about $70,000 for one year of treatment (the Indian biosimilar costs about $2,000). A biosimilar is "a biologic that is highly similar and has no meaningful differences from an FDA approved biological medication" (FDA n.d.).

Checkpoint Inhibitors

Checkpoint inhibitors are so named because they protect a site on the surface of cytotoxic lymphocytes that, when activated, causes the lymphocyte to cease functioning or die. Because the lymphocyte commonly dies, the site is also referred to as a programmed death (PD) site. The full scope of interactions between the immune system and cancer cells is not completely understood (Martínez-Lostao et al. 2015), but pembrolizumab (Keytruda), the best of the checkpoint inhibitors so far, can be used as an example of our current understanding of checkpoint inhibitors. As depicted in Figure 3, Panel A, the checkpoint, PD1, is open, and the cytotoxic lymphocyte can attack the cancer cell. In Panel B, the cancer cell has secreted a ligand, PDL1, that attaches to PD1, causing the lymphocyte to cease functioning. In Panel C, pembrolizumab, a monoclonal antibody, has covered part of PD1 in such a way that it protects the lymphocyte from PDL1, enabling it to continue to function and attack the cancer cells. The effectiveness of pembrolizumab is directly related to the quantity of PDL1 molecules secreted by the cancer cells that can attach to PD1.

The FDA has approved pembrolizumab's use for malignant melanoma (Ribas et al. 2016; Robert et al. 2015), non-small cell lung cancer of all types (Gandhi et al. 2018), cancer of the stomach (Shitara et al. 2020), cervix (Colombo et al. 2021), kidney (Motzer et al. 2021), breast (Cortes et al. 2022), and others. Due to this wide variety of indications, sales soared to $17 billion in 2022, making it the fourth best-selling drug in America. Pembrolizumab has been especially effective for the treatment of melanoma. The FDA's approval of pembroli-

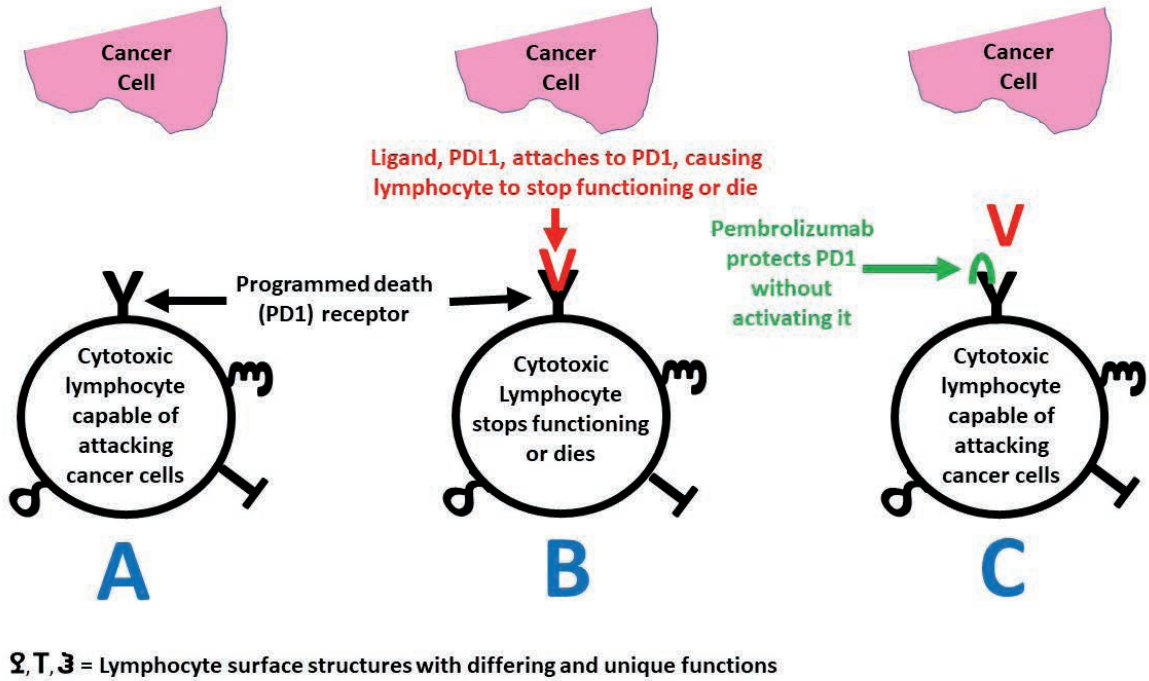

Cancer Cell
Cancer Cell
Cancer Cell
Ligand, PDL1, attaches to PD1, causing lymphocyte to stop functioning or die
Programmed death (PD1) receptor
Pembrolizumab protects PD1 without activating it
Cytotoxic lymphocyte capable of attacking cancer cells
Cytotoxic Lymphocyte stops functioning or dies
Cytotoxic lymphocyte capable of attacking cancer cells
A
B
C
Ϙ, T, Ɜ = Lymphocyte surface structures with differing and unique functions

Figure 3. Mechanism of Action of Checkpoint Inhibitors. Panel A: Programmed death receptor on cytotoxic lymphocyte is open. Panel B: Cancer cell secreted ligand (PDL1) attaches to programmed death receptor, PD1, causing lymphocyte to cease functioning or die. Panel C: Pembrolizumab prevents the ligand from attaching to the receptor, enabling the cytotoxic lymphocyte to continue its attack on cancer cells. Figure by author.

zumab for immediate sale was based mainly on the results of a large clinical trial comparing pembrolizumab with ipilimumab (Yervoy) in patients with advanced melanoma (Robert et al. 2015). In all endpoints of the trial, pembrolizumab was better than ipilimumab, which, at that point, was the standard of care. The median survival was 32.7 months for pembrolizumab and 17.9 for ipilimumab, a highly significant finding. Moreover, at the seven-year follow-up, the average survival rate had risen to 32.8 months.

In other words, a significant number of the patients who passed the median survival continued to live for several years. This is a truly significant finding, considering that not long ago the five-year survival rate for melanoma was less than 5 percent. However, the way to optimize the use of these drugs is not clear. For example, pembrolizumab given before and after surgery (neoadjuvant-adjuvant) yields better outcomes than after surgery only (adjuvant) (Patel et al. 2023). The results for the other cancers have not been as striking but are as good or better than all other known treatments.

That explains why so many oncologists switched to pembrolizumab. However, as noted above, methodological and statistical issues should be considered in all cancer studies even with very promising findings such as those with pembrolizumab. For example, patients who were very ill were excluded from these studies. In addition, pembrolizumab, like all immunological drugs, has substantial toxicity. Unlike other cancer drugs, however, most of the side effects are allergic in nature. Individuals with known allergies are prone to flares or recurrences. Depending on the drug and its specific mechanism of action, severe side effects affect from about 15–55 percent of recipients (Brahmer et al. 2021). Cost is also a consideration. The estimated cost per month for five of the six FDA approved PD1 checkpoint inhibitors ranges from about $12,000 to $17,000; for the sixth, it is about $25,000.

Prevention of Cancer

The prevention of cancer brings many benefits, such as increased years of life and cost savings. Several probable or definite causes of cancer are known (Table 3), and exposure to many of the causes can be reduced or eliminated (Table 4).

The potential benefits to be gained by preventing cases of cancer are exemplified by the decline in the prevalence of smoking and the subsequent decline in lung cancer mortality. The mortality rate for lung cancer among men peaked in 1990 at 90.1 deaths per 100,000 population then, due almost entirely to the reduced prevalence of smoking, declined to 40.1 in 2019, a drop of 55 percent (American Lung Association 2022). Similarly, the mortality rate for lung cancer among women peaked in 2002 at 40.1 then declined to 28.2 in 2019, a drop of 30 percent. The decline in prevalence of smoking has taken many years—the link between smoking and lung cancer was declared in 1964 (US Department of Health and Welfare 1964)—and has not been easy. It shows, however, the

Table 3

Examples of Probable or Definite Causes of Cancer (American Cancer Society 2010)

External Factors

1. Tobacco
2. Chemicals (e.g., asbestos, benzene, alcohol)
3. Radiation
4. Infectious organisms (e.g., hepatitis B, human papilloma virus, Helicobacter pylori)
5. Hormone replacement therapy with estrogens

Internal Factors

1. Genetic mutations
   a. Inherited
   b. Acquired
2. Hormones (e.g., estrogen)
3. Immune disorders (e.g., AIDS)
4. Epigenetic changes
5. Obesity

Table 4

Examples of Behaviors that Reduce the Risk of Acquisition or Death from Cancer (American Cancer Society 2022)

Behaviors to prevent developing cancer:

1. Stop smoking (lung and other sites).
2. Avoid obesity.
3. Eat a healthy diet.
4. Be physically active.
5. Reduce alcohol consumption.
6. Get vaccinated.
   a. Hepatitis B vaccine
   b. Human papilloma virus vaccine
7. Treat infections of Helicobacter pylori with antibiotics.
8. Prevent infection with HIV virus.
9. If indicated, take chemoprophylaxis.
   a. Tamoxifen (high risk breast cancer)
   b. Finasteride (prostate) (not approved for this use by FDA)

Screening to find cancers early and improve likelihood of successful treatment:

1. Breast cancer
2. Cervical cancer
3. Colorectal cancer

potential benefits from cancer prevention activities.

Approximately 42 percent of newly diagnosed cancers could be prevented (American Cancer Society 2022) by modification of the risk factors in Table 4. Smoking tobacco alone is estimated to account for 19 percent of new cancers today. A combination of overweight, physical inactivity, excess alcohol consumption, and poor nutrition cause another 18 percent (American Cancer Society 2022). Vaccination against or treatment of infectious causes of cancer are also helpful. Since the approval of a vaccine against the human papilloma virus (HPV) in 2006 among women fifteen to twenty-nine years of age, the incidence of squamous cell and adenocarcinoma of the cervix have declined 2–8 percent, the higher rates among younger age groups (Mix et al. 2021).

Billions of dollars are being spent to develop and deliver sophisticated therapies for the treatment of cancer. Much of this money would be more productively used to prevent it.

Conclusion

Despite two major federal initiatives, cancer remains the second most common cause of death in the United States, and, compared with heart disease and stroke, rates have declined relatively little. Recent and ongoing developments in the use of immunotherapy, as shown by the checkpoint inhibitor pembrolizumab, will add to the utility of current treatments. However, the cost of developing these drugs has been huge, treatment is quite expensive, severe side effects are frequent, and especially considering the cost and side effects, the gains so far have been small. True, a few patients may benefit greatly from these advances, but they are a small proportion of the total number of people who have cancer and do nothing to prevent the development of cancer in more people.

Preventing cancer before it occurs should be the highest priority and deserves an appreciably greater level of support; an estimated 42 percent of the expected new cases of cancer could be prevented. Many modifiable causes are known, and programs to avoid or reduce several of those causes have been shown to be effective. As Ben Franklin noted around 250 years ago, "An ounce of prevention is worth a pound of cure." ■

Acknowledgment

I would like to acknowledge the aid and encouragement of Kenneth E. Powell in this work. He has been an invaluable resource.

References

American Cancer Society. 2010. *Cancer Facts & Figures, 2010.* Atlanta, GA: American Cancer Society.

———. 2022. *Cancer Facts and Figures 2022.* Atlanta, GA: American Cancer Society.

American Lung Association. 2022. *Lung Cancer Mortality.* Online https://www.lung.org/research/trends-in-lung-disease/lung-cancer-trends-brief/lung-cancer-mortality.

Brahmer, J., H. Abu-Sbeih, P.A. Ascierto, et al. 2021. Society for immunotherapy of cancer (SITC) clinical practices guideline on immune checkpoint inhibitor-related adverse events. *Journal for ImmunoTherapy of Cancer* 9: e002435.

Cameron, D., M.J. Piccart-Gebhart, and R.D. Gelber. 2017. 11 years' follow-up of trastuzumab after adjuvant chemotherapy in HER2-positive early breast cancer: Final analysis of the HERceptin Adjuvant (HERA) trial. *Lancet* 389(10075):1195–205.

Colombo, N., C. Dubot, D. Lorusso, et al. 2021. Pembrolizumab for persistent, recurrent, or metastatic cervical cancer. *New England Journal of Medicine* 385(20): 1856–67.

Cortes, J., H.S. Rugo, D.W. Cescon, et al. 2022. Pembrolizumab plus chemotherapy in advanced triple-negative breast cancer. *New England Journal of Medicine* 387(3): 217–226.

Elfin, J. 2022. Deaths by cancer in the U.S. 1950–2019. Online at www.statistica.com/statistics/184566/deaths-by-cancer-in-the-us-since-1950/.

Food and Drug Administration. N.d. *Biosimilar Product Regulatory Review and Approval.* Online at https://www.fda.gov/files/drugs/published/Biosimilar-Product-Regulatory-Review-and-Approval.pdf.

Gandhi, L., D. Rodriguez-Abreu, S. Gadgeel, et al. 2018. Pembrolizumab plus chemotherapy in metastatic non-small-cell lung cancer. *New England Journal of Medicine* 378(22): 2078–92.

Heron, M., D. Hoyert, S. Murphy, et al. 2009. Deaths: Final data for 2006. *National Vital Statistics Reports* 57(14).

Martínez-Lostao, L., A. Anel, and J. Pardo. 2015. How do cytotoxic lymphocytes kill cancer cells. *Clinical Cancer Research* 21: 5047–56.

Maruvka, Y., M. Tang, and F. Michor. 2014. On the validity of using increases in 5-year survival rates to measure success in the fight against cancer. *PLoS ONE* 9(7): e83100. Online at https://doi.org/10.1371/journal.pone.0083100.

Mix, J., E. Van Dyne, M. Saraiya, et al. 2021. Assessing impact of HPV vaccination on cervical cancer incidence in women 15–29 years in the United States, 1999–2017: An ecologic study. *Cancer Epidemiology, Biomarkers & Prevention* 30(1): 30–37.

Motzer, R., B. Alekseev, S. Rha, et al. 2021. Lenvatinib plus pembrolizumab or everolimus for advanced renal cell carcinoma. *New England Journal of Medicine* 384(14): 1289–300.

Murphy, S., K. Kochanek, J. Xu, et al. 2021. Mortality in the United States, 2020. NCHS Data Brief. Dec(427): 1-8. PMID: 34978528.

National Center for Health Statistics. 2022. NCHS Data Visualization Gallery - Mortality Trends in the United States. Online at https://www.cdc.gov/nchs/data-visualization/mortality-trends/.

Patel, S.P., M. Othus, Y. Chen, et al. 2023. Neoadjuvant-adjuvant or adjuvant-only pembrolizumab in advanced melanoma. *New England Journal of Medicine* 388(9): 813–23.

Ribas, A., O. Hamid, A. Daud, et al. 2016. Association of pembrolizumab with tumor response and survival among patients with advanced melanoma. *Journal of the American Medical Association* 315(15): 1600–9.

Robert, C., J. Schachter, G.V. Long, et al. 2015. Pembrolizumab versus ipilimumab in advanced melanoma. *New England Journal of Medicine* 372(26): 2521–32.

Rohaan, M.W., T.H. Borch, J.H. van den Berg, et al. 2022. Tumor-infiltrating lymphocyte therapy or ipilimumab in advanced melanoma. *New England Journal of Medicine* 387(23): 2113–25.

Shitara, K., E. Van Cutsem, Y. Bang, et al. 2020. Efficacy and safety of pembrolizumab or pembrolizumab plus chemotherapy vs chemotherapy alone for patients with first-line, advanced gastric cancer. *Journal of the American Medical Association Oncology* 6(10): 1571–80.

Spector, Reynold. 2010. The war on cancer: A progress report for skeptics. Skeptical Inquirer 34(1): 29-31.

US Department of Health and Welfare. 1964. *Smoking and Health: Report of the Advisory Committee of the Surgeon General of the Public Health Service.* Washington, DC: US Department of Health and Welfare.

Reynold Spector, MD, has served as a professor of medicine (and pharmacology and biochemistry) at Iowa, Stanford, and Harvard-MIT. Dr. Spector is the author of over 200 peer-reviewed scientific papers and one textbook. His award-winning work has principally concerned drug and vitamin function, transport and homeostasis in the central nervous system, the effect of food on function of the kidney, and treatment of poisoned patients. Dr. Spector also served at Merck from 1987 to 1999, retiring as executive vice president in charge of drug development. He oversaw the introduction of fifteen new drugs and vaccines, several of which help to prevent cancer.

Science Does Not Have All the Answers—and This Is Not a Problem

Noting that science can't offer answers to everything is a rhetorical trick used by science deniers. This claim, however, helps us understand the nature of science.

GUILHERME BRAMBATTI GUZZO AND GABRIEL DALL'ALBA

Both in and outside the classroom, science educators are often confronted with a great range of questions about science. Usually, these questions are about scientific products (*What is evolution by natural selection?*) or scientific processes (*How did Darwin conclude that species evolve by natural selection?*).

Other questions, however, may be more challenging; they address the epistemic authority of science and demand knowledge about why we should trust scientific inquiry as a reliable way—or *the most* reliable way—to answer certain questions about ourselves and the world.

On one occasion, one of the authors of this article was talking to a relative, "Parker," a medical practitioner. Parker asked about the scientific consensus on the possible coexistence of human beings and (non-avian) dinosaurs. On the surface, this question seems to demand some blend of scientific products and processes be answered, but the real motivation behind it was soon apparent.

Considering what we know about the life and extinction of the dinosaurs and the origin of human beings, the answer is quite simple: the scientific consensus converges on the conclusion that humans and dinosaurs never coexisted. This is something we learn early in science classes, although some adults still think otherwise.

The next question Parker asked was how it is possible to know that dinosaurs went extinct millions of years before the appearance of modern human beings. That is indeed a question that every science student should ask: How *do* we know some scientific conclusion is true? So, the provided answer involved information from paleontology and geology, with explanations about fossil records and the interpretation of fossil data and so on. Parker interrupted: "But there is not a complete fossil record for all possible time for all strata and all geological layers, correct?" Yes, that is correct; we don't have a complete record of life on earth—if that means having fossils of *all* living organisms that have ever existed, as Parker implicitly concluded.

"So, science does not have all the answers," Parker replied, as if triumphantly revealing a fundamental flaw in science.

Again, that is correct. Science does not have all the answers, as banal as this statement is. There are at least three reasons for that: 1) the world around us is very complex, so it seems impossible to find good—let alone definitive—answers to a lot of questions; 2) science can inform but cannot give final answers to certain questions, including ethical ones; and 3) the scientific process is a never-ending endeavor because we recognize the need to, and therefore are open to, revise the things we know (or we thought we knew) and explore new ideas.

The world around us is complex. Even if we think of elements that occur on earth and ignore the mysteries of the universe, the multiplicity and complexity of processes—biological or not, macro- or microscopic—surrounding us is beyond our imagination. The plethora of behaviors from viruses to human beings, the manifestation of consciousness, and so many other phenomena challenge humankind's capacity to properly comprehend them.

This is obviously not the same as suggesting that we have not improved our understanding of the world (and ourselves) year by year. The COVID-19 pandemic has offered us examples of it: we quickly discovered its etiological agent, under-

stood ways of preventing new infections, and within a year developed efficient and safe vaccines against the disease provoked by SARS-CoV-2. Part of the advances in the pandemic were due to previous knowledge we had about respiratory viruses and vaccines. In other words, we have built knowledge on previous knowledge we had about topics that were related to the new coronavirus. And, although this knowledge may not be deemed as Absolute (with a capital A), it has been good enough to help us comprehend and fight the pandemic.

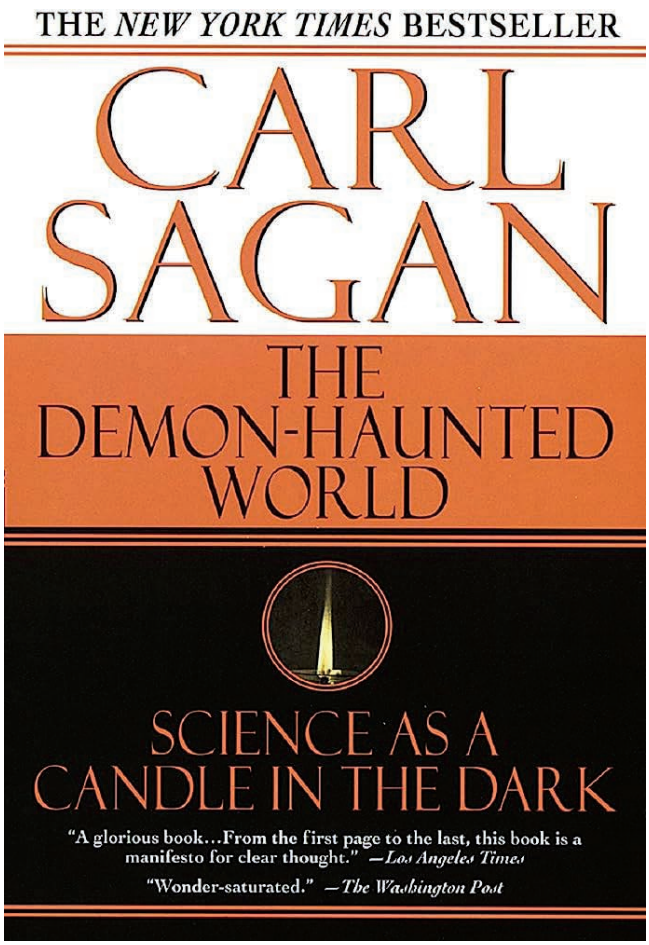
Science may be best understood as a continuous process in which inquiries about the world and ourselves hardly, if ever, have final answers. The philosopher Lee McIntyre highlights the *open-ended* character of science (McIntyre 2019); it operates under epistemic principles such as fallibilism, which demands open-mindedness, skepticism, and the continuous revision of ideas within communities of inquiry. So, when there are answers, they must never be regarded as definitive or beyond all possible doubt.

"Humans can have knowledge of the world, even though such knowledge is imperfect, and reliable comparisons can be made between competing theories or opinions." That is the essence of fallibilism in the words of Michael Matthews (2014, 70). Fallibilism, in this regard, is a position that is opposed to relativism and absolutism. We may, at the same time, discard the assumption that "anything goes" or that there are no better and worse ways to test ideas, and reject the notion that the current knowledge we have about the world and ourselves is absolutely perfect, incapable of improvement.

Understanding the fallible aspect of science can be helpful in avoiding misconceptions such as Parker's. Surely, we do not fully comprehend all geological eras or have a complete record of all possible fossils that ever existed. This is impossible even for recent animals like us, and it is a truly magnificent achievement that we were able to rescue so much from the history of life on our planet through records left by nature itself. Unfortunately, we will likely never find every little piece of evidence there is, and that is okay. It does not invalidate what has been recovered so far, nor does it cast any unreasonable shadows on our understanding of the evolution of different species.

Sometimes, as in the case of Parker, the "science does not have all the answers" approach has a malicious tone behind it, and science educators should be careful about this. It may be applied as a defense mechanism against having a conclusion disproved. Imagine if you argue with a UFOlogist that no space agency has yet to find any evidence of life beyond Earth and, therefore, conclude that the assertion "we are being visited by an alien civilization" makes little sense. As an answer, the UFOlogist claims that "science does not have all the answers," and so he maintains that you are in no position to say he is wrong. He is just trying to stick to his ideas, appealing to the gaps we will inevitably have in our body of knowledge as some kind of positive evidence for his belief.

However, not everyone who asserts this claim is using it as a defense mechanism against refutation. Some people may conclude, in good faith, that not having a complete answer


THE NEW YORK TIMES BESTSELLER
CARL SAGAN
THE DEMON-HAUNTED WORLD
SCIENCE AS A CANDLE IN THE DARK
"A glorious book...From the first page to the last, this book is a manifesto for clear thought." —Los Angeles Times
"Wonder-saturated." —The Washington Post

means not understanding something. It is the false dichotomy that Parker seems to have been trapped in: either science can give absolute answers to any question or it is not possible to trust a scientific conclusion at all. In this scenario, if people understand—correctly—that science can't deliver the Truth, in absolute and irreversible terms, they incorrectly conclude that science is unreliable or "just a way of looking at the world" that is in pace with the methods and conclusions of astrologers, dowsers, creationists, Bigfoot hunters, and the like.

If the "science does not have all the answers" gambit may be explored by science deniers, pseudoscientists, and others who dislike certain scientific conclusions, in the hands of a good science educator or communicator, the fallible aspect of science can provide a helpful tool to discuss an important element of the nature of science (fallibilism) and perhaps help students calibrate their acceptance of scientific ideas and augment their trust in the scientific processes and its conclusions.

Not answering all questions may seem to be a problem at first glance. Uncertainty, fallibilism, and an incomplete understanding of the world and ourselves are elements that are inescapable in science. And they have led to some of the best characteristics of science: its open-ended character and the social structure that helps us discover, justify, correct, and discard ideas.

We must feel comfortable with the fact that we will be

(more or less) ignorant about a great number of things. However, it does not mean that we should be happy to accept ignorance. The scientific process is, in its essence, nonconformity to ignorance. Contrary to common sense, we do not need "proven" answers—in the sense of being beyond all possible doubt—to live our lives and make well-informed decisions. They may not be the Truth itself, but, as Robert Pennock (2019, 6) argues, "a humbler sort of empirical truth that helps us make our way about in the world and that necessarily comes in degrees." That is enough for us.

Finally, as Carl Sagan (1996, 27) wrote in *The Demon Haunted World*: "Science is far from a perfect instrument of knowledge. It's just the best we have." Good answers to many of our questions (at least for those where scientific investigations are applicable) are found as a result of the work of the scientific community, despite being provisional and subject to refinement or even refutation. Not having all the answers is no demerit of science. Quite the contrary; it is thanks to the use of reliable methods of investigation, to the role of the scientific community in scrutinizing claims, and to its humility to appreciate the provisional character of knowledge that science can present us with so many good answers to so many different questions. ■

References

Matthews, Michael R. 2014. *Science Teaching: The Contributions of History and Philosophy of Science*. New York, NY: Routledge.

McIntyre, Lee. 2019. *The Scientific Attitude: Defending Science from Denial, Fraud, and Pseudoscience.* Cambridge, MA: The MIT Press.

Pennock, Robert T. 2019. *An Instinct for Truth: Curiosity and the Moral Character of Science*. Cambridge, MA: The MIT Press.

Sagan, Carl. 1996. *The Demon-Haunted World: Science as a Candle in the Dark*. New York, NY: Ballantine Books.

Guilherme Brambatti Guzzo is a biologist and an assistant professor of biological sciences at the Universidade de Caxias do Sul (UCS, Brazil). He is interested in the promotion of critical thinking and skepticism in science education and is the founder of the Brazilian science communication project Nas Trilhas da Razão (On the Trails of Reason).

Gabriel Dall'Alba is a biologist and currently an MSc student at the University of British Columbia (Canada). Dall'Alba is also founder of the Brazilian science communication project Nas Trilhas da Razão (On the Trails of Reason) and is interested in philosophy of science, philosophy of education, critical thinking, and the epistemic features of the nature of science.

Bring Us with You, Leave Us Anywhere!

Dear Reader,

You **love** our magazine, so please **help us spread the word about Skeptical Inquirer!** You can help in any of these fun ways:

1. Leave a copy of the magazine in your doctor's or dentist's waiting room.

2. Slip a copy in the pocket of the airline seat ahead of you during travel to your next exotic location (like CSICon in Las Vegas!).

3. Give a copy to a loved one, a friend —or a frenemy!

4. Write to us for our "I Doubt It" decals, perfect for the back window or bumper of your ride or anywhere a skeptical message needs to be seen.

We'd be happy to send you an extra copy of the magazine if you're not ready to give up one of yours just yet. Just send an email to sampleissue@skepticalinquirer.org, include your mailing address, and indicate what you plan to do with the extra copy.

The Freedom of Speech Does Not Protect Healthcare Grifters

KATIE SULETA

Heather Kokesch Del Castillo was a health coach and nutritionist living and working in California. She obtained a certificate in holistic health coaching from the Institute for Integrative Nutrition (Professional Wellness Alliance n.d.). She moved to Florida where she continued operating her health coaching and nutritionist business. In California, her business had operated inside the law. However, in Florida she was subject to legal consequences that required her to cease the nutritional consulting aspect of her health coaching business and ultimately close the business because the title of Nutritionist is legally protected (Saunders 2022a).

Health coaches are not regulated in any way. I've written before about the need for regulating the title of "health coach" and why it's important for consumers and patients (Suleta 2023). People who consult with a health coach assume that the coach is appropriately educated and trained to assist with their health goals. However, due to the unregulated nature of the profession, that is not necessarily the case.

Health coaches often offer nutritional guidance and advice (Cleveland Clinic 2021) and may also identify as nutritionists or otherwise claim to offer nutritional counseling. In some states, the title of "nutritionist" is unregulated, and in these states "anyone with an interest in diet or nutrition may call themselves a nutritionist" (Wartenberg 2020).

Like Del Castillo, many health coaches who offer guidance and advice on nutrition either do not have formal training in nutrition or have obtained a certificate from an unaccredited organization such as the Institute for Integrative Nutrition. These organizations are often founded and run by people who are not registered dietitians, nor do they have any formal training or education in dietetics or nutrition. For example, Joshua Rosenthal, the founder of the Institute for Integrative Nutrition, has a master's degree in education (International Health Coach University 2016) and is not a registered dietitian. His biography states that he has an advanced degree and "30 years in the fields of whole foods, personal coaching, and teaching" (International Health Coach University 2016). While Rosenthal may have *experience*—however ambiguously defined—in health and wellness, nowhere does it identify any training or education he has received in these arenas. Founding your own company based on an interest does not mean that you are qualified to provide training or advice in that space. Additionally, the Institute for Integrative Nutrition is not an organization that is accredited, though it "partners" with organizations that would have you believe that it is ("Institute for Integrative Nutrition Accreditation" 2023; Barrett 2013). Thus, the certificates and training that it provides to people is questionable at best, and there are plenty of other companies offering certificates in nutrition that provide questionable education without accreditation.

With the explosion in health coaching as a healthcare profession, obtaining a certificate (or not) in nutrition from a dubious organization and claiming to be a nutritionist (with or without a certificate) can easily go together. It can be a way for people to stack seemingly legitimate credentials to convince potential clients they are appropriately trained and therefore qualified to guide their health goals. Nutritionists, health coaches, health coaches also claiming to be nutritionists, and nutritionists also claiming to be health coaches are largely unregulated.

There are eighteen states plus the District of Columbia that regulate the title Nutritionist in some way (Nutritionist Ed 2020). If you live in one of those places, then this is one fewer aspect of health care you need to worry about. If not, you are on your own when it comes to vetting a health coach, nutritionist, or someone claiming to be both.

Del Castillo's case wound its way through the court system. Eventually, the U.S. Supreme Court was asked to hear her case in 2022 (Saunders 2022b), where her legal team claimed that the state of Florida violated her right to freedom of speech. As a spectator, it's not very convincing if the argument presented does not hinge on your qualifications to perform the job and claim the title but instead on your freedom of speech. In their response, the state of Florida wrote:

> Petitioner's position, if accepted, would have far-reaching consequences. Petitioner appears to submit that any professional licensing scheme is subject to challenge by unlicensed persons, armed with heightened scrutiny under the First Amendment, if any portion of that scheme can be said to "restrict speech" of those unlicensed persons. … That would throw into doubt the constitutionality of longstanding licensing schemes that have never been thought to present a general First Amendment problem, such as requirements that lawyers, doctors and architects obtain a license before they may hold themselves out, and provide advice, as professionals. (Supreme Court of the United States 2022)

An overall theme presents itself: Unscrupulous people are operating mostly outside the realm of professional oversight and regulation within healthcare. The patchwork of state laws around specific titles to work in healthcare without proper

People who consult with a health coach assume that the coach is appropriately educated and trained to assist with their health goals. However, due to the unregulated nature of the profession, that is not necessarily the case.

training are being exploited. Although health coaching may hold a lot of potential for healthcare, its reality will only be what we make of it. Without regulation, we are already starting to see unqualified people dispensing health advice.

While the Supreme Court denied hearing Del Castillo's case, this will not be the last time the issue of free speech versus credentialing will be before the courts. Given the current climate of animosity toward expertise (Hotez 2023), that should concern everyone. ■

References

Barrett, Stephen A. 2013. A Skeptical Look at the Institute for Integrative Nutrition | Quackwatch (July 7). Online at https://quackwatch.org/credential/reports/iin/.

Cleveland Clinic. 2021. Health Coaches: What They Do—and How They Can Help You (August 11). Online at https://health.clevelandclinic.org/what-is-a-health-coach/.

Hotez, P.J. 2023. *The Deadly Rise of Anti-Science: A Scientist's Warning*. Baltimore, MD: Johns Hopkins University Press.

Institute for Integrative Nutrition. 2023. Institute for Integrative Nutrition Accreditation (March 23). Online at https://www.integrativenutrition.com/career/certification.

International Health Coach University. 2016. Academic Team. Online at https://ihcu.com/academic-team/.

Nutrition Ed. 2020. Nutritionist, Licensed Nutritionist, and Registered Dietitian Requirements By State (October 27). Online at https://www.nutritioned.org/state-requirements/.

Professional Wellness Alliance. n.d. Case Study: Florida Practitioner Had to Shut Down Business. Online at https://www.pwai.us/casestudy.

Saunders, Jim. 2022a. U.S. Supreme Court has been asked to hear a case on a Florida health coach giving dietary advice. WUSF Public Media (August 13). Online at https://wusfnews.wusf.usf.edu/health-news-florida/2022-08-13/u-s-supreme-court-has-been-asked-to-hear-a-case-on-a-florida-health-coach-giving-dietary-advice.

———. 2022b. Florida asks the Supreme Court to reject a health coach's free speech case. WUSF Public Media (October 27). Online at https://wusfnews.wusf.usf.edu/courts-law/2022-10-27/florida-asks-the-supreme-court-to-reject-a-health-coachs-free-speech-case.

Suleta, Katie. 2023. Health care coaches are the next big thing. They're also completely unregulated. *STAT* (May 9). Online at https://www.statnews.com/2023/05/09/health-care-coaches-regulation/.

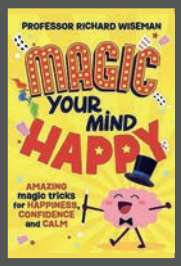
Supreme Court of the United States. 2022. *Heather Kokesch Del Castillo v Joseph A Ladapo* (October 24). Online at https://www.supremecourt.gov/DocketPDF/22/22-135/ 243734/20221024114336746_Del%20Castillo--FINAL%20BIO.pdf.

Wartenberg, Lisa. 2020. Dietitian vs. nutritionist: What's the difference?" Healthline (March 12). Online at https://www.healthline.com/nutrition/dietitian-vs-nutritionist.

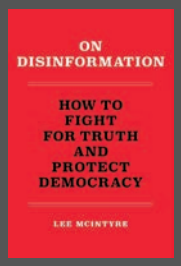
Katie Suleta is a trained epidemiologist and informaticist. She currently works as a regional director of research in graduate medical education for HCA Healthcare. She has an MPH, MSHI, and is a current Doctorate of Health Sciences student (DHSc) in Clinical Practice and Leadership at The George Washington University. She also writes for the American Council on Science and Health.

NEW AND NOTABLE BOOKS]

Edited by Stephen Hupp. Listing does not preclude future review.

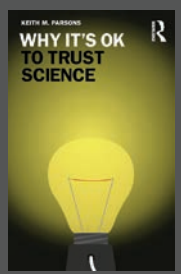


MAGIC YOUR MIND HAPPY: Amazing Magic Tricks for Happiness, Confidence and Calm. Available for preorder, psychology professor Richard Wiseman's latest book aims to help children "learn how to perform lots of seemingly impossible feats, including how to defy gravity, read minds, pluck coins from thin air, and predict the future." Wren and Rook, 2024, 192 pp., £9.99.

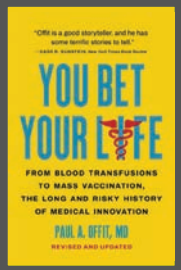


ON DISINFORMATION: How to Fight for Truth and Protect Democracy. Philosopher (and newly elected fellow of the Committee for Skeptical Inquiry) Lee McIntyre's little pocket book includes big ideas about truth—and how to protect it. The book draws on the author's "twenty years of experience as a scholar of science denial." The MIT Press, 2023, 184 pp., $14.95.

UNREASON (Best of Skeptical Inquirer, Volume 7). Edited by Kendrick Frazier and Benjamin Radford, this book presents forty-five of the greatest SI articles from the past decade and features "articles from writers including Neil deGrasse Tyson on the process of science, Richard Dawkins on the standards of truth, Elizabeth Loftus on memory, Steven Pinker on the notion of progress, and many others." Prometheus Books, 2023, 410 pp., $29.95.



WHY IT'S OK TO TRUST SCIENCE. Philosophy professor Keith M. Parsons critiques the detractors of science, such as anti-vaxxers, climate change deniers, and unscrupulous profit-seekers. The book distinguishes "genuine skepticism—upon which science depends—from dogmatic denial." Routledge, 2023, 242 pp., $24.95.


YOU BET YOUR LIFE
FROM BLOOD TRANSFUSIONS TO MASS VACCINATION, THE LONG AND RISKY HISTORY OF MEDICAL INNOVATION
PAUL A. OFFIT, MD

YOU BET YOUR LIFE: From Blood Transfusions to Mass Vaccination, the Long and Risky History of Medical Innovation (Revised and Updated). Available for preorder, physician Paul A. Offit revised and updated this book designed to help readers understand the risks associated with medical choices. Basic Books, 2024, 288 pp., $19.99.

FUN & GAMES

Edited by Stephen Hupp.

Easter Egg Hunt

One page in this issue of Skeptical Inquirer has seven hidden "Easter Eggs." Can you find them all? Hint: Six of them involve words, but the seventh involves something else.

Antique Mallarkey

Bigfoot found! Check out this discovery from an antique mall in Springfield, Illinois: *Big Foot: The Giant Snow Monster Game* (copyright 1977). The object of the game is to "Be the last survivor after BIG FOOT has frightened everyone else away." To play, each player places tokens on different spots on a Candyland-like board. At times, different players control Bigfoot while the other players do their best to avoid an encounter. The last player with a token on the board is the winner!

A Few Words on Secret Writing

1‡(16*†6*3 ;46) 2?3 :‡? †‡ †8)8(¶8 3‡0† 2?; .5:98*; 6*);85† 6))‡98;46*3 :‡?'(8 ;‡0† 6* ;48 05); 6))?8 5*‡;48(-‡†8 46†8) 6; -‡?0† 480. 5 0‡; ;‡)88 ;48 (85( )6†8) -‡*)6†8(;48 .05;8) *‡; ‡*8 2?; 500 ;8* :8) :‡? -5*)‡0¶8 5 45(† -6.48(5356* ;48 16(); ;‡)8*† 6* 5 16¶8 †636; -‡†8 6) *‡; :8; †‡*8 ‡* ;46))8-(8;6¶8 (‡5† 6; (8.(8)8*;))‡98;46*3 1‡(:‡? ;‡)5: 5 3‡‡† 46*; 1‡(:‡? 6*¶‡0¶8) -460†(8*') .05: 6;'))‡98;46*3 :‡? 0‡¶8 6)?(80: †‡ 28; ;800 98 ;48 (6††08 ;48* :‡?'00 28 500)8;!

Find 3 groups of 3 connections...

SPOCK	COOKIE	HUNTER
TELLER	CARRIE	ANAKIN
BONES	BALL	CARDS

Connectivity

These words can be divided into three categories, each with three words. They are all connected by a single theme. Can you discover all three categories and identify the theme? Your brain is great at finding patterns—sometimes this helps, but other times it hurts! You can find the answer in the "Secrets Revealed" section of this issue.

The Movie Review THEY Don't Want You to Read

Steve Cuno

The UFO Movie THEY Don't Want You to See. Written, produced, and directed by Brian Dunning. Released August 17, 2023.

Over the past year, UFO lore seems to have tightened its grip on the public's imagination. This is thanks largely to politicians who think that "I know a guy who says he has stuff that'll blow your mind" is evidence and "You can't prove it *didn't* happen" is the ultimate mic drop. So it is that the recent release of the documentary *The UFO Movie THEY Don't Want You to See* couldn't have been better timed.

Many Skeptical Inquirer readers are likely familiar with the work of writer-producer-director-onscreen host Brian Dunning. Dunning is founder and CEO of Skeptoid Media, best known for its nonsense-busting podcast. Given that connection, I suspect it will not be much of a spoiler if I reveal that the "THEY" in the movie's title does not refer to evil scientists and government officials keeping us sheeple in the dark.

The title's ruse aside, *The UFO Movie* loses no time in tipping its skeptical hand. Fewer than two minutes in, Dunning's voiceover describes the recent UFO-related media blitz as "the latest craze on TV's pseudoscience and pseudo-history networks." Lest his use of the word *craze* fail to place on alert anyone steeped in UFO cover-up conspiracy thinking, Dunning follows up, "But how much of that thinking is informed by the real sciences?"

Of course, no one is more adept than the committed UFO believer at greasing the term *real sciences* until it becomes impossibly slippery. This raises a question as to whom *The UFO Movie* will enlighten. For the immovable believer, there's always one more anecdote, one more "what about …" one more "yeah, but …" The film may but steel their resolve, goading them into writing off Dunning as one of the duped or as part of The Conspiracy.

The film sings to the scientifically skeptical, but they are the choir who need no convincing. This is not to say that the film isn't worth the choir's while. *The UFO Movie* presents useful, in-depth information, much of which will be new and of interest even to informed UFO skeptics.

Perhaps our highest hopes should be for viewers who respond to congressional and media hype with honest questions. For them, the film offers not just answers but guidance on how to dig for them. Before plunging into UFO claims, Dunning deals with good versus poor evidence, statistical likelihood, and the importance of falsifiability, along with a dash of special relativity. It's a decent primer on critical thinking that artfully avoids use of that dread, often off-putting term. Though the above may sound like a soporific recipe,

Brian Dunning. Image Credit: Michael Myers

Dunning pulls it off tedium-free by intercutting interviews with experts who do not let the pace slow. The experts themselves represent a refreshing array, each a far cry from the stuffed-shirt-in-a-lab-coat cliché.

With *real sciences* thus defined, the film plunges into some of the most popular and seemingly convincing alien visitation claims. (For the sake of word economy, I'll dispense with adding "alleged" to each of the following.) There's the group of U.S. airmen who found and examined a downed alien spacecraft in Rendelsham Forest, England. The Zimbabwean schoolchildren, sixty-two of them, who witnessed a flying saucer land near their playground. The UFO that knocked intercontinental ballistic missiles (ICBMs) offline in Malmstrom, Montana. The Gimbal, Gofast, and Nimitz/Tic Tac videos, all from the U.S. Navy, all showing aircraft maneuvering beyond earthly craft capability as described in these pages. And there's a delightful interview with Josh Carter regarding a sighting famously reported by his grandfather, former President Jimmy Carter.

Skeptical Inquirer readers will not be surprised to learn that much as some professional skeptics discourage use of the term *debunking*, a responsible debunking is ultimately what *The UFO Movie* delivers. Alas, we emerge with no alien visitors. But the process treats us to a masterclass in detective work and sheds additional light that is captivating in its own right.

Not that *The UFO Movie* takes all the fun out of UFOs (or UAP, for you pedants). When it comes to the statistical likelihood of intelligent life elsewhere in the universe, Dunning reveals himself as excited as any UFOlogist. The problem is that physics seems bent on not letting anyone who isn't lucky enough to be a science fiction character get from here to there or from there to here. But radio waves, which happen to be light and, therefore, travel at light speed, could provide a means of communication. Picking up a signal at either end is a statistical long shot but possible. Indeed, Dunning cites the WOW Signal, a seventy-two-second narrowband radio signal detected in 1977, that has yet to be eliminated as a possible hello from Out There.

The hardboiled film critic will find aspects of *The UFO Movie* to pick at. Why that camera setup? Why not cut away from this or that scene a few frames earlier? Why feature Dunning, who is an experienced presenter but not a film actor? I suggest that these are not shortcomings but elements attesting to the film's authenticity. With the exception of composer Lee Sanders's soaring score, this is no slick Hollywood production. It's real. And when it comes to UFOlogy and documentaries in general, real is in too short supply.

Visit the movie's homepage to see an updated list of viewing options (https://www.briandunning.com/ufo/). ■

Disclosure: The producer and I are personally acquainted. Not to worry; I promise this review was not biased in his favor. Ask anyone who knows me. I am not that good of a friend.

Steve Cuno is *Free Inquiry* magazine's former humor columnist and the author of five books, including *Behind the Mormon Curtain: Selling Sex in America's Holy City* (Pitchstone). He lives in Portland, Oregon.

Grimcutty Reveals Dark Thread Tying Together Cases of Moral Panic

David Tolkacz

Grimcutty. Written and directed by John Ross. Produced by 20th Digital Studio and Capture, 2022.

Not all teen horror is vapid. The film *Grimcutty* manages to make a completely next-level contribution to a genre packed with recycled tropes. Though the reviews were bad, they were wrong. *Grimcutty* likely struck a nerve with its parent-targeted moral panic narrative but will delight anyone with a sufficiently nuanced background in the study of curses. And as skeptics, there are few events more fitting of the word *curse* than moral panics.

The story is built loosely on the Momo Challenge, which gained some notoriety in 2019 but resulted in relatively little chaos. *Grimcutty* plays on the panic created by Momo in the figure of the eponymous demon who gains power along a vector of parental concern.

In the tradition of the best curse movies, the feedback loop of parental concern and control serves ostensibly to mitigate the internet meme's harm, but it only manages to isolate the teenagers from the support of their friends, which is heavily diminished by their lack of social media access. The interplay of panic and prevention manufactures a dynamic best described by the law of reversed effect: The more concern the parents show for their children, the stronger Grimcutty gets, creating a cycle by which the parents' worry escalates until their children really do become the victims of the demon.

The psychological depth of *Grimcutty* and the play of horror motifs make it well worth your attention despite the kneejerk criticism that rendered the movie a flop. To skeptics, the movie illustrates relevant concerns involving moral panics that often produce the same hellish realities they are ostensibly hoping to prevent.

As background, the original Momo hoax spread the idea that teens were being manipulated by an internet meme to do outlandish things, such as harm themselves or place themselves in danger, for attention. The story was entirely baseless, but the panic it created was very real. It dissipated more quickly than other moral panics, but in the age of the internet, everything moves faster. (For more, see Benjamin Radford's "The Rise and Fall of the 'Momo Challenge' Online Suicide Game Conspiracy," SI, May/June 2019.)

Like all moral panics, there is a kernel of truth that gets decontextualized to make the fear both universal and imminent. And like all moral panics, it is based on a core myth that turns out to be a lie. So where is that kernel of truth? Teen suicide and social media addiction are now a major headline well-deserving of our concern. And there are plenty of legitimate reasons for parents to consider the impact social media has on their children.

As I was preparing this article, I had to shut down my laptop to avoid distraction from notetaking. The addictive power of these social media apps is real. They condition how we think, how we communicate, and how we relate to one another. And we've only just begun to understand the social and psychological impact. So, there is cause for reasonable concern that would take the form of longitudinal studies and thorough research of acute cases where Facebook is being blamed for the suicides of teens.

There is good reason to protect teenagers and children from certain types of content and addiction. But panic derived from false rumors makes any solution into a problem, feeding the vicious cycle and acting as a catalyst for terrible outcomes.

Jeffrey S. Victor, in his article "The Social Dynamics of Conspiracy Theory: From Satanic Panic to QAnon" (SI, July/August 2022), wrote about the social dynamics of conspiracy rumors, which he differentiated from conspiracy theories.

While any one person can have a theory, a rumor needs to take root in multiple individuals to spread. So, to understand conspiracy theory from the vantage of a social contagion, we must consider the sociological impact of rumor.

Rumors bolster individuals who would otherwise be mocked for holding ill-considered beliefs. When these beliefs spread, the individuals in the group are empowered to spread the rumor because they have a social support network in place. Even if they are mocked in public spaces, they always have a safe place to retreat within their echo chamber where conspiracy beliefs are reinforced. The tactical use of undergirding the conspiracy theory with fears concerning children has roots that go all the way back to Socrates, who was pressured to end his life on the grounds that he was "poisoning the children."

In *Grimcutty*, the fear is specifically related to concerns about social media addiction, the tactical use of psychology to make the platform more addictive, and the exposure of youth to potentially toxic content that can convince them to do risky things that put themselves and others in danger.

A British court recently ruled that the suicide of a fourteen-year-old girl was Facebook's fault. The girl was exposed to "bleak" content on a relentless basis, according to the allegations, which caused her to spiral into a depression, and ultimately she took her own life (see "British Ruling Pins Blame on Social Media for Teenager's Suicide," *New York Times*, October 1, 2022). While Facebook most certainly needs to curate teen content more intentionally, suicide is probably not the most likely result of being exposed to bleak content on the platform. Some people revel in bleak content while others ignore it. And clearly some are deeply impacted by it.

The risk is that we generalize a tragedy like this to create a moral panic around social media. While there *are* risks for teens and parents do need to be aware of them, the overarching moral of *Grimcutty* is that you cannot mitigate genuine concerns by isolating your children, and often the fear is more damaging than the reality. ■

David Tolkacz is a digital artist, poet, and copywriter working in Buffalo, New York. His work can be found on davidtolkacz.com. As a skeptic, he is interested in moral panics and the history of religion and the state.

SECRETS REVEALED

IN THIS ISSUE...

Answer to "Connectivity" (see page 61)

Group #1: A crystal *ball*, chicken *bones*, and tarot *cards* are tools used to see the future.

Group #2: *Spock*, *Carrie* White, and *Anakin* Skywalker are fictional characters with paranormal abilities.

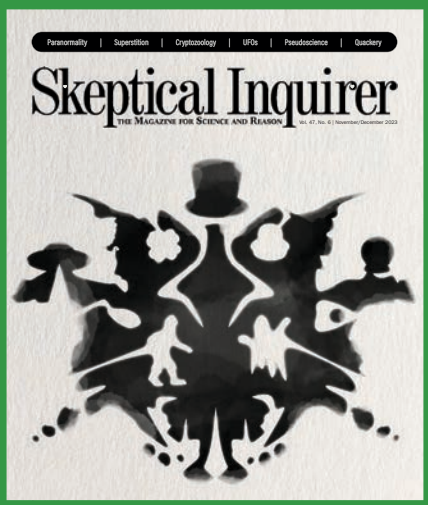
Group #3: Fortune *tellers*, fortune *cookies*, and fortune *hunters* are terms that start with the word *fortune* that relate to psychic abilities.

Theme = paranormal abilities.

IN THE NOV/DEC 2023 ISSUE...

Secrets on the Cover

Rorschach Inkblots normally don't have intentionally hidden images, but the previous SI cover did. Did you find all thirteen? Here they are, starting in the upper left corner and going (somewhat) clockwise:


Paranormality | Superstition | Cryptozoology | UFOs | Pseudoscience | Quackery
Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON

1. Heart in the "k" (for Kendrick Frazier)
2. Heart in the "r" (for Ruth Frazier)
3. Rubber ducky (for quackery)
4. Crystal ball
5. Planchette (from a Ouija board)
6. Ghost
7. Bigfoot (or the Carolina Lizard Man)
8. Bent spoon (for pseudoscience)
9. UFO (or UAP)
10. Back half of Pigasus (a flying pig)
11. Four leaf clover (for superstition)
12. Top hat (for magic)
13. The whole blot is a monster's face

Anything else you saw was unintentional but also perhaps interesting. Let us know what else you found; we promise not to analyze you! (But we may publish your findings.)

Secret in the [REDACTED] Section

The [REDACTED] article also contains a major secret hidden on page [REDACTED]. This is the most important secret in the last issue because it involves a prize for the first person to fully solve the riddle and email the solution as a Letter to the Editor. A major hint can be found in this issue on page [REDACTED].

Secret in the NEW AND NOTABLE Section

The description of the book *Everybody's Magic* includes back-to-back use of the word *the* on page 58. It's hard to notice because *the* appears on two different lines (first at the end of a line and then at the beginning of the next line). The author of the book, Richard Wiseman, has previously pointed out this difficult-to-catch typo, and we also pointed it out in the next book description, for *Nobody's Fool* written by Daniel Simons and Christopher Chabris, experts on inattentional blindness. Also, while you were reading this, a gorilla just walked by in the background. Did you see it?

Persuasive Bullshitters

I enjoyed John V. Petrocelli's article "Persuasive Bullshitters and the Insidious Bullshit Hypothesis" in the September/October 2023. It ended up being a fitting testament to the legacy of Frankfurt. While I agree with the general contours of Petrocelli's thesis, a few qualifications might be in order. First, if one replaces the word *persuasive* with *coercive* in the title, would the observations still stand? I think they would, perhaps without needlessly conflating persuasive messages with manipulative trickery (often also too hastily labeled "mere Sophistry"). Second, a historical reference might explain my first observation. For Aristotle, rhetoric was a mixture of ethos, pathos, and logos. Of those, the first bears scrutiny as it was further divided into character, intelligence, and goodwill. Third, while Petrocelli's experiments all involve the test of "a broad array of rhetorical strategies," it isn't clear to me that they are all, as a consequence, ethically persuasive ones. As he explains (twice) regarding the first experiment, "students were led to believe" something. While *persuasion* is never explicitly defined in the article, it is, at least to me, clear that *being led to believe something* is, at least in part, coercive. As such, it would violate at least one of Aristotle's components (goodwill) of ethos. Luckily, Petrocelli ends by sounding a positive, if untested, note. Those engaging in bullshit might experience "negative consequences" once their manipulation is exposed. I think a background in rhetoric might help.

Mark Porrovecchio
Assoc. Professor of Rhetoric
Director of Forensics
Oregon State University
Corvallis, Oregon

John V. Petrocelli responds:

If by replacing "the word persuasive *with* coercive *in the title," Mark Porrovecchio means that a coercive form of bullshit would lead to similar attitude changes as reported in my article "Bullshitting and Persuasion: The Persuasiveness of a Disregard for the Truth" (*British Journal of Social Psychology *60: 1464–1483), I wouldn't bet on it. Many experimental studies have demonstrated that people typically respond to direct commands with reactance (i.e., resistance), rather than compliance, to reassert their freedom. Participants in those studies were exposed to a traditional persuasion (i.e., attitude change in the direction of a persuasive message) procedure and not forced to believe anything; they were free to report their attitudes in whatever direction and extremity they wished. The historical reference to Aristotle is fine, but it is unclear if it adds or subtracts anything from what can be gleaned from my* British Journal of Social Psychology *paper. The two references to "students were led to believe" something were in no way part of the persuasive messages. What students were led to believe was a hypothetical, yet feasible, context for the purposes of introducing and measuring reactions to an attitude object (i.e., attitudes about a new policy). Learning about a feasible, but hypothetical, campus policy and being asked their opinions about it is in no way coercive. As for obtaining a helpful background in rhetoric, I'll agree to audit Porrovecchio's course in contemporary rhetorical theory so long as he agrees to audit my course in experimental social psychology.*

Unsubstantiated Claims?

Re: D. Alan Bensley and Cody T. Watkins, "Who Believes Unsubstantiated Claims?," September/October 2023. In 1978–1979, for a 200-level experimental psychology course, I compared subjects' scores on an internal/external locus of control scale to their scores on a post-hypnotic suggestion (PHS) response scale. The hypothesis was that those who perceived themselves as controlled from without would be more susceptible to PHS and those who perceived themselves as controlled from within would be less susceptible to PHS. The statistically tested results showed the converse. Perhaps those who felt controlled resisted and those who felt in control acquiesced to the harmless suggestions of the investigator, respectively. If the concept of locus of control is still relevant, how would it correlate with the believing of unsubstantiated claims? I suspect that the perception of external locus of control would predict skepticism of unsubstantiated claims and that the perception of internal locus of control would predict acceptance of unsubstantiated claims (which smells awfully like a mixture of confirmation bias and Dunning-Kruger Effect).

James M. Zimar
Hammondsport, New York

Talk to a Science Denier

In "How to Talk to a Science Denier" (September/October 2023), Lee McIntyre writes that a very good way to confront a science denier is to ask them what potential evidence might make them change their beliefs. The implication, and expectation, is that if someone is brought to the realization that no such evidence is possible, then they'd realize how unreasonable they're being and possibly change their mind. What a great way to differentiate between unreasonable and reasonable beliefs!

To most skeptics, this probably seems like a sound approach. McIntyre's article is the latest in a series of recent items in SI that make this claim. But it's not hard to think of beliefs we all have that we consider completely rational and that nothing we can imagine could change. For example, a rational atheist, when encountering a seeming miracle, will always find a natural explanation for it. Even if a vast, complicated, ridiculously expensive conspiracy is ruled out, they can always fall back on the assumption that they were hallucinating. Every natural explanation is more rational to them than every supernatural one. Therefore, there is no conceivable evidence that would make them believe in god(s). However, I think most of us would agree that this is a rational position.

In case this doesn't change your belief that unassailable beliefs can still be reasonable, let's take the example a step further. A rational person can doubt any of the evidence presented by their senses, but (following Descartes) it's not rational for a person to doubt their own existence. To restate that: all evidence (including any evidence that seems to show one doesn't exist) can be doubted, but one's own existence is an unassailable, and yet very rational, belief.

Of course, I'm not claiming that scientific people are unreasonable or that flat-earthers are reasonable. But the relative validity of beliefs has nothing to do with how assailable they are. There's probably something that makes our beliefs "better" than theirs, but whatever that is, it has nothing to do with one's willingness to change one's own mind. The search continues …

Patrick Niesink
Prescott, Ontario, Canada

Lee McIntyre responds:

Bravo! The wonderful challenge issued here for skeptics to reflect on our own adherence to the principles we use to judge the "irrational" beliefs of others is developed at further length in my forthcoming Skeptical Inquirer *essay "Is Rational Belief in Improbable Theories Ever Warranted?"*

NASA Studies UFOs?

Mick West, in his column in the September/October 2023 issue, fails to consider a very likely motivation for NASA's chief, Bill Nelson, starting the AARO panel to "investigate" UFOs. First, it is important to acknowledge that former Senator Bill Nelson, while a political professional, is also a former astronaut. Because he is a Democrat, I would surmise that he wanted to get ahead of Republicans in Congress using UFO conspiracy nonsense to accuse the Biden administration of a cover-up.

Unlike the Department of Defense (DOD) investigation that could be criticized for withholding facts behind classification barriers, NASA, as a civilian agency, would presumably have no classified basis for hiding the truth. Because NASA has access to a wider body of space and atmospheric scientists than the DOD, hopefully the AARO panel can offer more detailed and trustworthy explanations for some of the observations that were not forthcoming from the DOD.

Bernard Roth
Santa Barbara, California

Mick West responds:

Avoiding partisan allegations of a cover-up seems an unlikely motivation. The most interesting UFO cases will remain classified and inaccessible to NASA's open-data project. As long as there are unexplained cases—which is unfortunately inevitable—there is an opportunity to claim there is a cover-up. Drawing attention to the topic (by holding a high-profile investigation) will not help curb such suspicions. What we need is more openness from the DOD.

Information Wars

Re: Benjamin Raford, "Information Wars: Videos vs. Books," September/October 2023. The author recommends trusting books over online sources (e.g., YouTube) as a research resource. This is a mistake. There is no reason whatsoever for a claim to be more accurate just because it's on a piece of paper rather than on a screen. Information found in books might have been thought correct when the book was published but is now known to be wrong based on more recent work. Books have contained wrong information for centuries, long before there was anything like the internet. He didn't even recommend to check the copyright date.

Isaac Wingfield
Santa Rosa, California

Ben Radford responds:

My column neither states nor suggests that a given claim is more accurate just because it's on a piece of paper rather than on a screen (or, for that matter, if spoken in an audiobook). The question was not whether a given statement was more or less credible when represented in printed versus digital form. Instead, it was about comparing the credibility of media or sources of information *(in this case YouTube videos and published books) for research purposes, which is a very different matter. I describe in detail the limitations of the different media, including the ability to provide additional references, utility in research, and efficiency (books can yield much more information than a comparable video for amount of time spent on them). That books can contain outdated and wrong information is both obviously correct and irrelevant to the question I answered.*

Understanding Astrology

Pseudoscience and the Paranormal by Terence Hines was in 1988 a great inspiration for me as a budding skeptic. But Hines's review of *Understanding Astrology* (September/October 2023) finds the explanation given by Dean et al. for Gauquelin's Mars Effect convincing. I beg to differ. At least three of the authors were personal friends of Michel

Mikhail Markovskiy - stock.adobe.com

Gauquelin and highly motivated to picture him in a favorable light. The book contains thirteen photographs of him, some with the authors in them too.

Suitbert Ertel discovered one Gauquelin bias, namely his judgment of who was or was not a true sports champion. Gauquelin also made other mistakes, notably reusing hypothesis-forming data for new tests. I discovered another bias: Sports encyclopedias contain many errors and each time the data seemed suspect, the corresponding champion was retained or not depending on his or her Mars sector. I wrote extensively on it in Skeptical Inquirer, November/December 1997.

Understanding Astrology is mum about that but spends thirty pages on Dean's theory (see also Skeptical Inquirer May/June 2002). Supposedly around the beginning of the twentieth century, French fathers lied massively to the authorities about the time of birth of their children to deceive the planets. Then the supposed correlation between the ambitions of the parents and the later careers of the children would show up as planetary effects. Ertel didn't buy it.

Jan Willem Nienhuys
Waalre, Netherlands

Who Betrayed Anne Frank? (Correction)

I chose "The Life and Times of Anne Frank" on *Mastermind*, a BBC Television quiz program on which contestants choose their own subject, so I was very interested in Joe Nickell's article (September/October 2023). It is a very good article, but two minor errors should be noted. Bergen-Belsen was not an extermination camp and had no gas chambers or other mass killing facilities; its appalling death toll was caused by starvation and disease. And Karl Silberbauer, the man who led the group who arrested the hiders in the Annex, was Austrian, not German. (I anticipated that one of my *Mastermind* questions would ask for his name, and I was right.) He became a police officer in Austria after the war. Otto Frank said he had no quarrel with him and he was just doing his duty.

Ray Ward
London, United Kingdom

The editor responds:

Thank you for sending in the correction about the Bergen-Belsen concentration camp. Thanks also for the additional information about the Austrian Karl Silberbauer who was both an Austrian police officer as well as an investigator for the West German federal intelligence service. In that same testimony about Silberbauer, Otto Frank added, "The only thing I ask is not to have to see the man again."

Committee for Skeptical Inquiry

Scientific and Technical Consultants

Gary Bauslaugh,
writer and editor,
Victoria, B.C., Canada

Martin Bridgstock,
senior lecturer, School of Science,
Griffith Univ., Brisbane, Australia

Richard Busch,
magician/mentalist, Pittsburgh, PA

Shawn Carlson,
Society for Amateur Scientists,
East Greenwich, RI

Roger B. Culver,
prof. of astronomy, Colorado State Univ.

Felix Ares de Blas,
prof. of computer science,
Univ. of Basque, San Sebastian, Spain

Nahum J. Duker,
assistant prof. of pathology,
Temple Univ.

Barbara Eisenstadt,
psychologist, educator, clinician,
East Greenbush, NY

William Evans,
prof. of journalism and
creative media, Univ. of Alabama

Bryan Farha,
prof. of behavioral studies in education
(retired), Oklahoma City Univ.

John F. Fischer,
forensic analyst, Orlando, FL

Eileen Gambrill,
prof. of social welfare,
Univ. of California at Berkeley

Luis Alfonso Gámez,
science journalist, Bilbao, Spain

Sylvio Garattini,
director, Mario Negri Pharmacology
Institute, Milan, Italy

Laurie Godfrey,
anthropologist, Univ. of Massachusetts

Gerald Goldin,
mathematician, Rutgers Univ., NJ

Donald Goldsmith,
astronomer; president, Interstellar Media

Alan Hale,
astronomer, Southwest Institute for Space
Research, Alamogordo, NM

Clyde F. Herreid,
prof. of biology, SUNY Buffalo

Gabor Hrasko,
chairman of the European Council of
Skeptical Organizations (ECSO), president
of Hungarian Skeptics

Michael Hutchinson,
author; Skeptical Inquirer
representative, Europe

Philip A. Ianna,
assoc. prof. of astronomy,
Univ. of Virginia

I.W. Kelly,
prof. of psychology, Univ. of
Saskatchewan,Canada

Richard H. Lange,
MD, Mohawk Valley Physician
Health Plan, Schenectady, NY

Rebecca Long,
nuclear engineer, president of Georgia
Council Against Health Fraud, Atlanta, GA

John R. Mashey,
computer scientist/executive (Bell Labs,
then Silicon Valley), analyst of climate-
change denial, Portola Valley, CA

Thomas R. McDonough,
astrophysicist, Pasadena, CA

James E. McGaha,
astronomer, USAF pilot (ret.)

Joel A. Moskowitz,
director of medical psychiatry, Calabasas
Mental Health Services, Los Angeles

Julia Offe,
neurobiologist, science journalist, creator
of German Science Slam

John W. Patterson,
prof. of materials science and
engineering, Iowa State Univ.

James R. Pomerantz,
prof. of psychology, Rice Univ.

Tim Printy,
amateur astronomer, former Navy
nuclear reactor operator/division chief,
Manchester, NH

Daisie Radner,
prof. of philosophy, SUNY Buffalo

Robert H. Romer,
prof. of physics, Amherst College

Robert J. Samp,
assistant prof. of education and
medicine, Univ. of Wisconsin-Madison

Steven D. Schafersman,
asst. prof. of geology, Miami Univ., OH

Chris Scott,
statistician, London, England

Stuart D. Scott Jr.,
associate prof. of anthropology,
SUNY Buffalo

Erwin M. Segal,
prof. of psychology, SUNY Buffalo

Steven N. Shore,
prof. of astrophysics, Univ. of Pisa, Italy

Sarah G. Thomason,
prof. of linguistics, Univ. of Pittsburgh, PA

Tim Trachet,
journalist and science writer, honorary
chairman of SKEPP, Belgium

David Willey,
physics instructor, Univ. of Pittsburgh, PA

THE MYTHS OF ENDLESS ENERGY
COLD FUSION THIRTY YEARS ON
THE ENERGY CATALYZER HOAX
INTELLECTUAL HUMILITY: A GUIDING MAP FOR SKEPTICS
Skepticism and Pseudoexperiments
Creationists Continue Assault on Science
ALIENS
UFO Identification Process
Why Humanoid Aliens?
Might Aliens Be Worms?
Skeptical Inquirer
COVID-19 MISINFORMATION
Targeting Conspiracy Theories, Superstition, Lies, Immunity Myths
How to Think about the Pandemic
THE SCIENTIFIC FRAUDS BEHIND THE FALSE VACCINE-AUTISM CLAIM
THE POSSIBLE WORLDS OF ANN DRUYAN
THE SELFISH GENE
REVISITED
RICHARD DAWKINS
STILL EMBATTLED AFTER ALL THESE YEARS
Project Greenglow
Creationism in Europe

Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON

Now Available Online!
Subscriptions & Single Issues

Visit Our Website to Learn More:
www.skepticalinquirer.org/subscribe

CENTERS FOR INQUIRY
www.centerforinquiry.org/about/branches

United States Branches

CFI Austin
Austin, Texas
austin@centerforinquiry.org

CFI Indiana
350 Canal Walk, Suite A
Indianapolis, Indiana 46202
(317) 423-0710
indy@centerforinquiry.org

CFI Long Island
Long Island, NY
li@centerforinquiry.org

CFI New York City
P.O. Box 26241, Brooklyn, NY 11202
nyc@centerforinquiry.org

CFI Portland
PO Box 3378, Portland, OR 97208
portland@centerforinquiry.org

CFI San Francisco
San Francisco, CA, sf@centerforinquiry.org

CFI Tampa Bay
Box 139 c/o O'Keefe
4011 S. Manhattan Ave., Tampa, FL 33611-1265
tampa@centerforinquiry.org

CFI Washington DC
dc@centerforinquiry.org

CFI West
2535 W. Temple St, Los Angeles, CA 90026
(323) 666-9797, la@centerforinquiry.org

CFI Western New York
1310 Sweet Home Road, Amherst, NY 14228
(716) 636-4869 ext. 402
wny@centerforinquiry.org

International Branches

CFI Argentina
Los Antiguos, Santa Cruz Province,
Argentina
Alejandro Borgo
alejandroborgo@gmail.com

CFI China
China Research Institute for Science
Population
NO. 86, Xueyuan Nanlu Haidian Dist.
Beijing, 100081 China
8610-62170515
Zheng Nian
nzhjx@yahoo.com.cn

CFI France
Universite of Nice
Faculte Des Sciences
Parc Valrose, 06108
Nice Cedex 2, France
+33-489.15.02.28 (only on Wed. p.m.)
Henri Broch
Henri.Broch@unice.fr

CFI Kenya
Center For Inquiry–Kenya
United Youth Group House, Wing B
Makadara, Jogoo Road
Kenya
George Ongere
geongere@yahoo.com

CFI Peru
Calle El Corregidor 318
Urb. El Manzano, Rimac
Lima 25-PERU
Manuel Paz y Mino
mapymc@yahoo.com

CFI Poland
01-876 Warszawa
Ul. Broniewskiego 99/147
Poland
Andrzej Dominczak
dominiczak@wp.pl

CFI Spain
Madrid, Spain
Luis Alfonso Gamez
lgamez@terra.es

cfi
CENTER FOR INQUIRY

Experience ***one*** of this century's ***most intelligent*** minds.

Readers of *Skeptical Inquirer* will love Kendrick Frazier's new books!

He wrote *Shadows of Science* as a "love song about the joys of science." With Benjamin Radford, he also coedited *Unreason*, volume 7 of the Best of *Skeptical Inquirer* series, which includes forty-five articles written by science communicators such as Neil deGrasse Tyson, Richard Dawkins, Elizabeth Loftus, and Steven Pinker.

VOL. 7
BEST OF
Skeptical Inquirer
EDITED BY KENDRICK FRAZIER AND BENJAMIN RADFORD
UNREASON
SHADOWS OF SCIENCE
HOW TO UPHOLD SCIENCE, DETECT PSEUDOSCIENCE, AND EXPOSE ANTI-SCIENCE IN THE AGE OF DISINFORMATION
KENDRICK FRAZIER
WITH A FOREWORD BY RICHARD DAWKINS